

Industry at Grips with Recovery Act

All major National Associations focus attention on organization and code problems involved in procedure under the legislation

INTENSIVE work by scores of committees in all branches of the automotive industry is bringing a clearer appreciation of the responsibilities and problems that procedure under the National Industrial Recovery Act imposes. Already there has been a considerable crystallization of opinion and purpose but, with the exception of tentative outlines, formulation of codes still is in the primary stages. Moreover, many organization wrinkles have yet to be ironed out.

Consideration of the problems raised by the Act already is accomplishing worthwhile results through concentrating the industry's attention upon the evils that have crept into its competitive activities during and preceding the depression.

To date the only code proposal revealed in detail by any of the industry's divisions is that of the National Automobile Dealers Association. A detailed summary of this code appears on page 23 of this issue of *Automotive Industries*. It is worthy of special mention here, however, that while this code sets up a procedure for putting used car trading on a 20 per cent gross profit basis, it does not touch upon the many controversial points in factory-dealer relationships such as fleet discounts, closed territories, clean-ups, etc. The association takes the sound view that these are matters requiring joint consideration with the N.A.C.C.

So far the N.A.C.C. has given no indication of what it proposed to do. In a public statement, its presi-

dent, Alvan Macauley, said that the car makers had no overproduction problem nor did they want to fix prices. Moreover, General Johnson is reported to recognize that wages and working conditions in the car factories are above any minimums which the government might set. Nevertheless, the General did tell *Automotive Industries* last week that the industry will file a code. While it is quite generally believed that the car makers are luke-warm to the idea, because of administration attitude, if for no other reason, it is felt that the N.A.C.C. decision will be to file a code in a spirit of cooperation.

Labor a Problem Under the Act

The labor angles of procedure under the Act offer a particular problem to the automobile makers that some other industries have not had to face. The administration agrees that wage and working conditions in their factories are fair. They were established without resort to collective bargaining and consequently it is understandable if the car makers show some hesitancy about getting themselves into

a position where they might be forced to deal collectively with their employees. That their fears on this score are not idle, is indicated by the fact that the American Federation of Labor is allowing no grass to grow under its feet, having held organization meetings in Detroit on June 19 and 26.

In addition to the labor question, the car makers may face some difficult problems as a result of code provisions adopted by parts makers and suppliers calling for selling prices at some fixed percentage of cost. Naturally, if such provisions are approved, the car makers are going to be vitally interested in the method of cost determination and the consideration given to quantity orders.

At this date there naturally is considerable uncertainty as to interpretation and administration of the Recovery Act. Hearings on the cotton code now in progress are being carefully watched by all elements in the industry. Incidentally, Alfred P. Sloan, Jr., as a member of the Industrial Advisory Board, is in attendance at these hearings. It is of some significance that organized labor voiced its disapproval of the \$10 and \$11 wage and 40-hr.

proposals in the cotton code, urging strongly that \$14-\$16 were proper minimums and that the work week should not exceed 32 hr., which recommendations are substantially in accord with figures given by General Johnson in his June 25 radio speech. The proposal to limit machine operation to 80 hr. per week was opposed by tire makers producing their own fabric and supported by manufacturers buying this material.

Reverting to developments within the industry, manufacturers of parts, accessories, equipment, service equipment and tools, etc., have, in the main, been working through established national associations. These organizations have outlined codes and have invited groups within the associations producing competitive or related items to develop group codes covering specific practices within their groups. Some of these groups already have held meetings.

Later, a unification of the various codes of association and groups is planned into one or more vertical codes representative of all of these elements in the industry. Present and future conferences will facilitate this development as they will help to define lines of demarcation. The federal administration may also be a factor in bringing about coordination under vertical code or codes.

Briefly, the activities of the major associations so far have been as follows:

N. A. C. C.

National Automobile Chamber of Commerce—A committee composed of Donaldson Brown, General Motors; Robert C. Graham, Graham-Paige; B. E. Hutchinson, Chrysler; A. E. McKinstry, International Harvester, and H. L. Moekle, Ford, is making a complete study of the provisions and interpretations of the National Industrial Recovery Act to date and are planning further meetings and hearings in preparation for the development of a code of fair competition when and if such a code is deemed necessary.

N. S. P. A.

National Standard Parts Assn.—has submitted to General Johnson at Washington for approval as to form and contents a basic code of fair trade practice for manufacturers of automotive service parts, service materials and supplies, accessories, service tools and equipment.

The code outlines ten major divisions of the parts manufacturing industry, provides for the administration of the code, sets maximum working hours and minimum wages, and singles out for special mention certain alleged practices which are designated as "unfair methods of competition" in operation of warehouses; extension of special price terms, salesmen gratuities, etc.; price contracts; "free goods" merchandising plans, etc.

Under the N.S.P.A. plan, sub-committees are being organized and code meetings are being held by manufacturers in the following divisions: motor parts; transmission and differential; gasket and asbestos products, ignition and electric; shop equipment; chassis parts; ball and roller bearing; fiber and rubber products; chemical products, and service tools. Further sub-divisions of these groups will also hold meetings, including manufacturers of gaskets, brake lining, pistons, valves, cylinder heads, rings, etc.

The committee consists of five manufacturers and wholesaler members as follows: A. G. Drefs, McQuay-Norris Mfg. Co.; H. N. Nigg, Piston Service Co., Detroit; F. C. Bahr, Arrowhead Steel Products; L. H. Phelps, Phelps-Roberts Co., Washington; L. F. Hunderup, Van Norman Machine Tool Co., Springfield.

M. E. W. A.

Motor and Equipment Wholesalers Assn.—appointed a special Recovery Act Committee consisting of S. B. Dean, Nicols, Dean & Gregg Co., St. Paul; George Niekamp, Beck & Corbitt Co., St. Louis, and E. M. Lewis, Lewis Motor Mart Co., Dayton. Adopted a tentative code for further development in cooperation with other wholesalers of the industry. Planned meetings of 21 regional groups for further consideration of the code. Takes the stand that automotive wholesaling is an industry in its own right and as such is entitled to individual code consideration. Approval of the code activities of the association thus far was unanimously given at the Summer Conference of representatives of the 21 regional groups held in Chicago, June 19-21.

M. E. M. A.

Motor and Equipment Manufacturers Assn.—Busy with preliminary plans for organization of entire industry and detailed changes in the organization of the associa-

tion to adapt it better for operation under the National Industrial Recovery Act. Have basic code tentatively prepared but probably will not file it until internal reorganization of the association is effected and six major group meetings have contributed information and suggestions.

The M.E.M.A., of course, differs from others in the industry in that it embraces a large number of the major original equipment manufacturers of the industry in addition to five other major groups consisting of replacement parts manufacturers, accessory manufacturers, shop equipment manufacturers, service tool manufacturers, and chemical manufacturers, all five of which sell through wholesalers.

N. A. D. A.

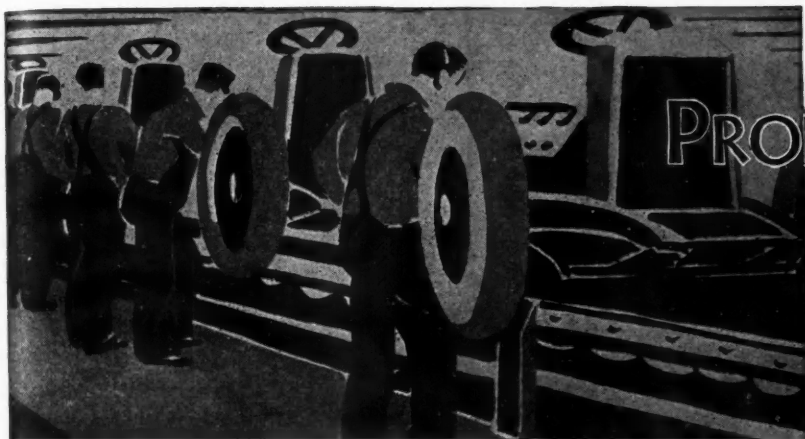
National Automobile Dealers Assn.—Pressing plans to bring all dealers of America under the provisions of the Industrial Recovery Act through N.A.D.A. leadership. Has prepared a basic code and is organizing meetings in 25 districts, at which the code is being presented and sentiment is being recorded for future guidance of the association in further code development activities. Detailed summary of code appears on page 23. F. W. A. Vesper, N.A.D.A. president, conferred with N.A.C.C. representatives in Detroit on June 29.

S. E. A.

Shop Equipment Associates—Held a meeting in Chicago last week and will meet again in Cleveland early in July. As a result of the activities of this group in conjunction with the major oil companies, it has already been decided that the oil companies will get out of the shop equipment business and in the future will buy equipment only for their company-owned stations.

Standards Yearbook, 1933

The well-known annual yearbook of the Bureau of Standards brought out during the administration of Roy D. Chapin is now off the press. Among its contents are sections devoted to International standardizing agencies, National standardizing laboratories, National industrial standardizing laboratories, etc. A section deals with technical societies and trade associations. Available through the U. S. Government Printing Office, Misc. Pub. No. 139.



PRODUCTION LINES

Handle and Drape

Scientific substitute for "handle" and "drape" of fabrics has been found by the Bureau of Standards. Technical News Bulletin No. 193 tells about it. One of the new instruments is the Flexometer, which enables one to measure the flexural attributes of cloth, paper, sheet rubber, etc. The results are related to the stiffness and creaseability of the material. The other instrument is the Compressometer, which provides a means of measuring the compressional attributes of the materials. These are related to softness, hardness, and springiness, as appreciated by squeezing the material between the fingers. What next?

What's 30,000

When some car builders permit options upwards of 30,000 combinations of colors, bodies, and other little things, it looks like something should be done about it. At least that's what we thought editorially in an article in *Automotive Industries* some time ago. Comes an announcement (confidential) from one of the leading producers along this line. Hereafter if the dealer orders a certain wanted color he must take at least a carload (four cars) in one body style. Carload orders must be firm and not subject to any change. How those production men must cheer.

Gadget Haven

Britons are going in heavy for gadgets as recent issues of their trade papers show. Radiator ornaments seem to be the rage. The latest crop includes a horse with a jockey up, eagle bravely perched on a ball, and a "nicely modeled skating girl."

Automotive Industries

Great Results

Was taken for a ride in a new A.C.F. Metropolitan bus described in *Automotive Industries* recently. Built like a streamlined street car with the comforts of a parlor coach, it has the agility of a high-powered passenger car. What a job to take out of a Sunday. We moted along at 50 m.p.h., passing cars on fairly heavy grades. It accelerates like a flash—30 seconds from standstill to 50. But the best thing about it is the clean, silent gear shift under all conditions.

Solves Problem

Use of nitrided Nitralloy boring bars is described by William Peterson, Kelly Reamer Co., in the *A.S.T.E. Journal* for June, 1933. Among the advantages for long bars such as are required for crankcase boring are: freedom from distortion by virtue of low temperature heat treating; availability of grades of Nitralloy and treatments which develop exceptional physical properties; high degree of surface hardness.

Mutually Convertible

Another Diesel engineer tells us that he is making headway in the matter of converting stock gasoline engines into compression-ignition simply by changing the head and adding fuel pump accessories. Feasibility seems to be determined primarily by the crankshaft dimensions of the gasoline engine, and secondarily by the C.-I. characteristics of the Diesel system being considered. Several important engine builders are going places along this line. Such engines are said to be marketable at prices lower than current quotations for C.-I. engines built from the ground up.

Portable Electricity

An up-to-the-minute development in electrical distribution for the continuous, fast moving production line is described in a Bull Dog booklet just off the press. It concerns the Trol-e-Duct system which provides a flexible source of power for electrically driven tools all along the line. This cleans up the ceiling, eliminates long cables, outlets, and what not. And the tools can follow the work within the limits of the line. If changes are needed the whole system can be taken down and relocated.

Put'n On Tool

We all laughed about it, but the "putting-on" tool really has been with us for some time. One form is the Metallizing process in which various metals may be sprayed directly on any parts that need building up either after wear in service or in production if the mechanic has slipped in cutting an expensive piece of work. The Metallizing process for spraying metal coatings is completely described in a bulletin recently issued by the International Metallizing Association. With the proper equipment and technique you can spray such materials as zinc, aluminum, lead, tin, cadmium, nickel, tantalum, stainless steels, etc. Worth looking into.

Add Corvusite

Deposits of corvusite and ralandite have been discovered by Smithsonian geologists in Utah near the carnoite beds, chief source of radium in the United States. Vanadium is the chief constituent of corvusite, otherwise known as ravenstone because of its purplish-black appearance resembling the feathers of a raven.—J. G.

MANUFACTURING
MANAGEMENT
METALLURGY

July 1, 1933

The first of a series of articles dealing with some of the fundamental problems underlying the design of automatic speed changing devices to meet the conflicting and changing requirements of operation

by P. M. Heldt
Engineering Editor,
Automotive Industries

AUTOMATIC

WITH most types of automatic devices there is some factor which it is desired to keep constant. For instance, a speed governor is ordinarily designed to maintain the speed of the machine to which it is attached substantially constant. If the speed is pulled down by an increase in load or resisting torque, the governor acts to increase the driving torque and so to restore an equilibrium at the predetermined speed. Similarly, an automatic temperature controller, if the device to which it is attached is cooled down below its normal temperature for any reason, acts to increase the rate of heat supply and thus to restore the normal temperature.

An automatic transmission evidently should be so designed as automatically to establish the best operating conditions for the car. But what are the best operating conditions? Some would look at the subject from the standpoint of maximum acceleration and maximum speed, while others would regard it from the standpoint of maximum economy.

If the driver wants either maximum speed or maximum acceleration he opens the throttle wide, and the transmission should then be so controlled as to allow the engine to just run up to its speed of maximum output, or the speed of the peak of the horsepower curve. For maximum acceleration the engine should continue to operate at this

speed and under full throttle throughout the accelerating period, for it is obvious that the acceleration will be a maximum if the power developed is a maximum.

The same conditions obtain in country driving. So long as the road surface and grade do not change, and there are no road obstructions, there is no reason why the gear ratio should be changed. Maximum speed is obtained with the car so geared that the engine operates at the power peak, and as a hill is encountered the gear ratio should be so changed that the engine can continue to operate under exactly the same conditions.

The thing that should be kept constant by the automatic transmission, therefore, is the engine power—the power that passes through the transmission. To determine how the gear ratio should be changed with a change in power, we may consider the case of acceleration. At the beginning of car acceleration, with the engine running at full speed, the gear ratio will be the maximum. As the car picks up speed, however, the engine will operate at that portion of its horsepower curve beyond the peak and its power will decrease. This decrease in power, therefore, should decrease the transmission ratio. The decrease in ratio would increase the torque load on the en-

gine and the latter would be pulled back to its peaking speed.

Now let us consider operation in hilly territory. The car has been running at maximum speed and now comes to a grade. Immediately the torque load on the engine is increased and the engine is pulled down in speed. The horse power of the engine is decreased, but in this case, to bring the engine back to its peaking speed, the transmission ratio must be increased.

We therefore have these conflicting requirements:

During acceleration, in order that the engine may be maintained at or near its peaking speed, as the load on the engine decreases the gear ratio must be decreased.

In steady driving, as the load on the engine decreases due to grades, etc., and it is pulled down in speed, the gear ratio must be increased in order to bring the engine back to its peaking speed.

It is therefore plain that although from the standpoint of maximum performance it is desirable to keep the engine operating at peaking conditions, engine horse power cannot be used as the factor controlling gear changes, because a decrease in engine load requires a decrease in ratio while accelerating and an increase in ratio when the traction resistance increases. Aside from this, a control device based

upon the amount of power transmitted would have to combine speed and torque elements and would probably be rather complicated.

There are evidently four factors that could be used, theoretically at least, to control the transmission ratio. These are:

1. Engine speed
2. Engine torque
3. Axle speed (car speed)
4. Axle torque

We will discuss these four possibilities successively.

Engine speed can be made to govern the transmission ratio through the medium of centrifugal weights. With this system, as the car accelerates, the engine speed

increased further, the high-speed friction clutch, which connected the main drive shaft directly to the crankshaft, also engaged. Both of the friction clutches were then engaged at the same time, but as there was an over-running clutch (or free-wheeling device) in the larger of the two gears on the countershaft, the low-speed gear was ineffective and the drive was direct.

With transmission of this type, the gear through which the car is being driven depends therefore entirely on the engine speed. Up to a pre-determined engine speed the car is being driven in low gear, and as this engine speed is reached, the shift to high gear is made. On de-

It will at once be seen that operation with an automatic gear of this type differs materially from habitual driving practice with hand-controlled transmission. With the latter, the driver usually accelerates the car in low gear until the engine is substantially up to its maximum speed, and then changes to a higher gear, that is, a lower ratio. In this way the car attains its maximum speed sooner than if the change-over were made at a lower engine speed. In regular driving, on the other hand, if the driver is forced to reduce his speed by traffic conditions, etc., he usually stays in high gear as long as the engine can handle the car in that gear with a fair degree of smoothness. This not only saves the engine, which will make a smaller number of revolutions per mile, but increases the fuel and oil economy, and, besides, tends toward increased passenger comfort in that vibration and noise are generally reduced. With the usual hand control there is certainly a great overlap of the ranges of engine speed over which the car is accelerated in low gear and is driven in high gear. With the type of automatic transmission described in the foregoing, this overlap is impossible, and this naturally is open to objection. Of course, one reason the average driver tries to stay in high gear as long as possible when he is forced to slow down by traffic conditions

OT TRANSMISSIONS

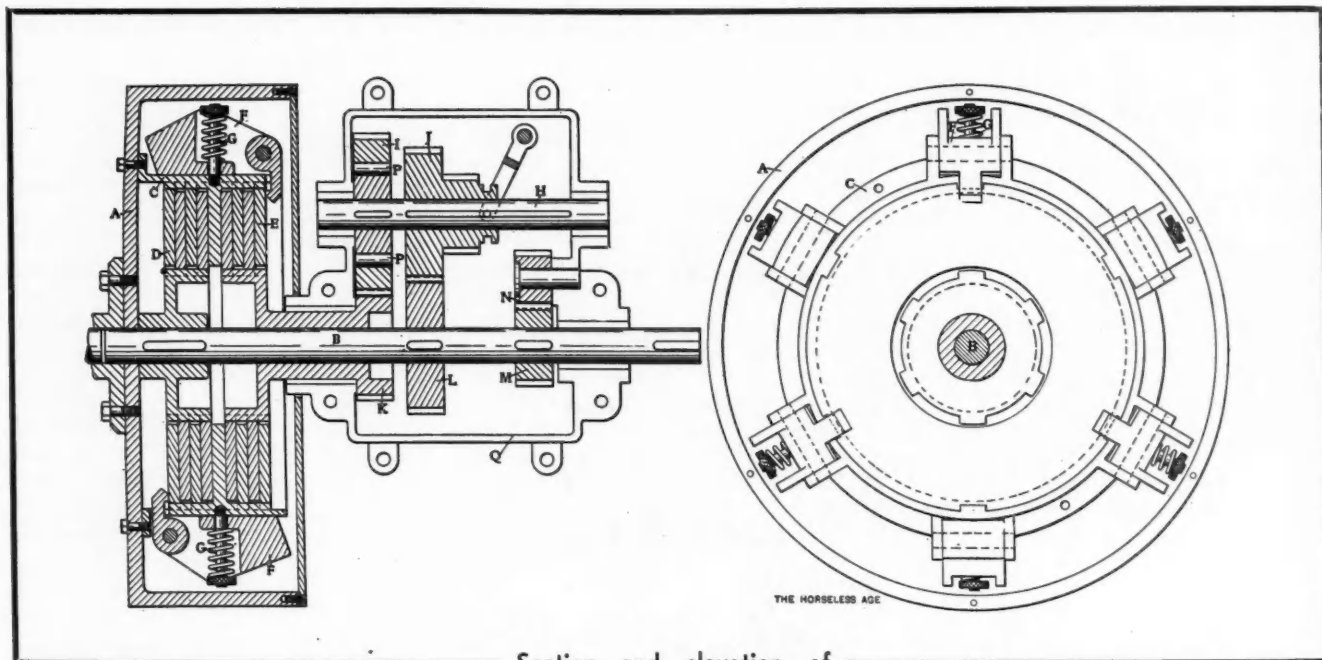
tends to increase, and since with increasing car speed the transmission ratio must be reduced, an increase in engine speed must result in a decrease in the transmission ratio. In steady running, as the engine speed is pulled down by an increase in traction resistance due to a grade, for instance, the transmission ratio must be correspondingly increased, and if the ratio is decreased by an increase in engine speed it naturally is increased by a decrease in speed. Hence the system functions properly—qualitatively at least—during both acceleration and steady running.

It is interesting to recall here that automatic control with a stepped transmission was first used by Sturtevant Brothers of Boston in 1904. The experimental car which they built had only two forward speeds, of which one was a direct drive and the other a geared drive through two pairs of spur gears arranged in the fashion of lathe back gears. Two friction clutches were enclosed in the flywheel, these clutches being controlled by centrifugal masses. At idling speeds both clutches were disengaged. As the engine was speeded up by opening the throttle, the clutch for the low gear was automatically engaged, and the car was then driven through the countershaft gears. As the engine speed

celeration, the shift from high to low gear is made at substantially the same speed. Since it is advantageous for obvious reasons to do most of the driving in high gear, the engine speed at which the shift is made must be comparatively low.

THE perfect automatic transmission would give the driver automatically the kind of performance he wants when he wants it. Obviously this is a big order and, because the problem is so difficult, perhaps explains why so many inventive minds are working on it at the present time. By automatic transmission, of course, is meant one in which the ratio of speeds of rotation of the driving and driven shafts is varied without the intervention of the operator. What the term does not indicate is the factor which is to control the change of gear ratio.

In this series of articles some of the fundamentals involved in the control of automatic transmissions of both the continuously variable and stepped types will be discussed.



Section and elevation of
Sturtevant Automatic Trans-
mission developed in 1904

is that he wants to obviate the need for the shift back into high. This consideration, of course, vanishes with the automatic shift, but considerations of reduced engine wear and tear, and increased fuel and oil economy still make it advantageous to keep in high gear down to comparatively low engine speeds.

Lean Mixture Preferred

We have here a condition that is very similar to that relating to carburetor-mixture control. Under most conditions of operation it is preferable to run on a lean mixture, because that results in maximum economy and is preferable also from several other standpoints. However, when it is desired to accelerate at the maximum rate or attain the highest possible speed, a rich mixture is preferable. This condition has been met by the provision of so-called economizers, which change the mixture-control adjustment when the throttle is opened wide.

It seems quite possible that some similar provision could be made to alter the adjustment of the gear-ratio control mechanism as the throttle approached the point of maximum opening. On part throttle, then, the car would stay in high gear down to quite low engine speeds, thus making it possible to enjoy the advantages of the direct drive over a wide speed range; while at full throttle the car would stay in low gear longer, thus reducing the time of acceleration up to the normal driving speed.

With all such automatic devices as those here described it is necessary to guard against the phenomenon known as hunting. Consider, for instance, that the transmission control mechanism were set to effect the change from low to high gear at 20 m.p.h. Now suppose that the car were being driven up a grade on which it could just about maintain 20 m.p.h. in high gear under full throttle. The slightest increase in traction resistance would cause the engine to drop below the change-over speed and the transmission would be

shifted into low. This in turn would cause the engine to speed up and the high gear would be engaged again, whereupon the cycle would be repeated. To prevent this, it is necessary to make provisions so that the change from high to low occurs at a considerably lower engine speed than the change from low to high, so that, although the engine will be pulled down in speed when the high gear is engaged, it will not be pulled down sufficiently to result in an immediate return to low gear.

Automatic control of the transmission ratio by engine torque, rear axle speed and rear-axle torque will be discussed in the following articles.

Magnet Shuts Off Fuel

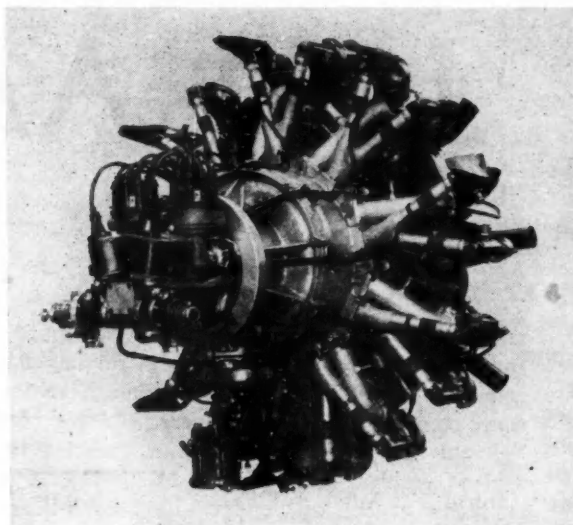
L. G. RILEY, an engineer of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has invented an electromagnetic fuel valve which shuts off the fuel supply of an airplane at the tank when the pilot turns off the ignition, thus reducing the fire hazards on airplanes. The valve comprises a steel core inside a tube, which latter forms an integral part of the gasoline line. An electric current passing through a coil of wire wound around the tube of the

valve, exerts a magnetic pull on the core and holds the valve open against spring pressure. When the pilot shuts off the ignition current, the current to the electric switch is also cut off, and the core, no longer held back by the magnetic pull, is closed by the spring.

Leakage in the valve is said to be eliminated by a flanged flared-tube joint. There are no stuffing boxes or packings, and the valve is said to remain leakproof throughout its life.

Supercharging Doubles Power of Race-Winning Airplane Motor

Potez 9 B supercharged engine of Deutsch cup winner



A POTEZ Type 53 monoplane won the Coupe Deutsch de la Meurthe, one of the more important aviation events of the season in Europe, by flying the 1250 miles of the race at an average speed of a trifle over 200 m.p.h. Engine displacement was limited by the rules to 8 liters or 488 cu. in., and since the race extended over a considerable distance and contestants had to land with practically the whole load, robust construction was called for.

The Potez 53 is of the low-wing cantilever type with a wing spread of 21 ft. 10 in. and has two wings attached to a center plane which is integral with the fuselage. The engine is the Potez 9 B, an air-cooled radial type specially designed to combine minimum drag, maximum horsepower and sufficient endurance to withstand the strains of the qualification flights and the race itself. It is based on the design of the Potez 9 A engine, which has a displacement of 594 cu. in. Supercharging was resorted to, rather than the use of very high compression, which latter results in maximum pressures and temperatures which are incompatible with reliable service. Direct drive of the propeller was decided on only after a prolonged study of the problem. In bench tests the air cooling proved quite effective, the temperature of the cylinder heads never exceeding 480 deg. F.

The standard production 9 A engine develops 180 hp. at 2000 r.p.m. for a piston displacement of 594 cu. in. and under the same con-

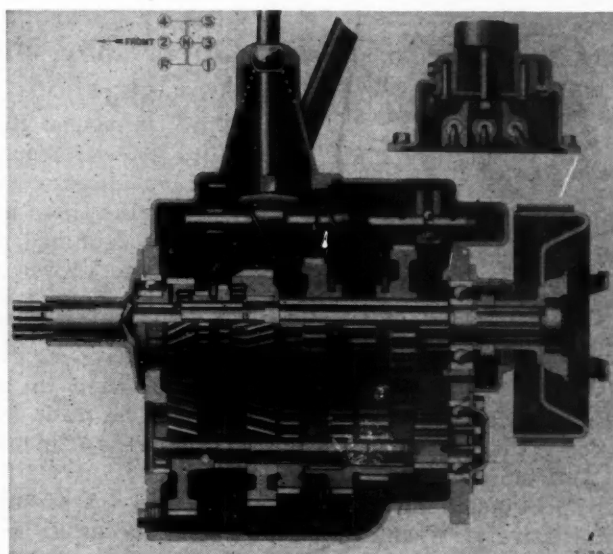
ditions of operation the 9 B should develop 148 hp. Actually it develops a maximum of 310 hp. at 2500 r.p.m. The gain is due chiefly to supercharging.

Following are the principal dimensions of the engine with which the winning plane was equipped: Number of cylinders, 9; bore, 3.86 in.; stroke, 4.59 in.; displacement, 488 cu. in.; compression ratio, 6 to 1; maximum output, 310 hp. at 2500 r.p.m.; total weight, dry, 374 lb.; outside diameter, 37.4 in.; supercharge ratio, 1.45; speed multiplication of supercharger, 11.5 to 1.

Five American Cars at Cairo Show

It is reported from Cairo by the U. S. Automobile Trade Commissioner to the Near East, that at the Cairo automobile show, there were cars from five American, seven British, four French, one Italian and one German manufacturer. There were 34,000 paid entries during the 18 days the show was open. About 60 passenger cars were sold, 40 being a low priced American make.

Dodge Adds 5-Speed Transmission



An outstanding feature of a 2-ton truck which has been added recently to the commercial vehicle line of Dodge Brothers is a five-speed forward and reverse transmission, of which a sectional view is shown above. The countershaft cluster of this transmission is mounted on roller bearings and the gears for the countershaft drive and the fourth forward speed are of the quiet helical type. Details of design of the transmission may be seen from the illustration.

JUST AMONG

Industry Will Have a Code

THE automotive industry is going to have a code approved under the Industrial Recovery Act. We make that prediction on the basis of what we have learned directly and indirectly from Washington rather than from anything coming from the automotive men themselves.

An N.A.C.C. committee, in fact, still is investigating, as we write, the need for submitting a code, the manufacturers already having expressed themselves in sympathy with the purposes of the new legislation.

It is our personal opinion that final action as regards a code for vehicle manufacturers will not rest in the hands of that committee, should its own decision be against code submission. This seems to be indicated by the published statements which have emanated from Gen. Johnson's office.

* * *

One Vertical Code for All

CERTAIN phases of operation under the Industrial Recovery Act, moreover, seem quite likely to be administered under the initiative of Washington so far as the automotive industry is concerned, even if the vehicle

makers and other elements of the industry do voluntarily submit codes covering the operations of their own parts of the business.

Final development of some sort of vertical code, linking all elements of the automotive industry, is probable, if we read the signs correctly.

Lacking any existing machinery for the development of such a vertical code, the various elements of the industry probably will find themselves waiting for Washington to exercise a coordinating function after individual codes have been submitted and approved.

* * *

Opportunity, Not An Obligation

THE Industrial Recovery Act, we believe, should be looked upon by industry as an opportunity rather than as an obligation. Good or bad, it is an existing fact. Viewed as an opportunity to improve handling of the vast economic forces which so nearly have engulfed us in national disaster, the new legislation can be made a potent tool in the hands of industrial executives.

Viewed by executives as an obligation—as an irritating intruder to be suffered as briefly as possible—it can become an in-

strument of torture to those managements which see only its unpleasant possibilities.

We commend for serious attention the statement made last week in a closed meeting by a hard-headed, broad-thinking executive who has spent his entire life operating businesses to make a profit. He said:

* * *

No Better Alternative

“NO one has come forward with any better suggestion or compromise between further drastic deflation and wild inflation than that which is afforded by the Industrial Recovery Act. The Administration gives organized industry every opportunity of working out its own salvation by mutual agreement within trade associations. It sets up conditions under which destructive minorities can be controlled by constructive majorities.

“Industry either must accept the challenge and prove its ability to conduct its own affairs, or look forward to complete socialization of industry, with a possible interim of unspeakable confusion and the possible development of communism.

“Let us approach the appointed task with the solemn thought

OURSELVES

that we are about to discover whether the joint forces of democratic government and collective industry can be so marshalled and directed as to control constructively the great economic forces which have, in some measure, been set in motion by these same agents."

* * *

Basic Changes Foreshadowed

WE are in the midst of stirring times; on the threshold, perhaps, of permanently different ways of doing business, of dealing with human relationships in industry, of administering the national economy.

Some will be inspired, some frightened and some angered by recognition of the possibilities of rather fundamental change. It is natural that some should resist such change vehemently; that some should foster it and that some should vision the final results of the New Deal as depending largely on the skill, initiative and courage with which individual industries and managements play the cards which have been dealt. With this latter group our own thinking runs. For this reason we urge rereading of the quoted paragraphs which appear above. N.G.S.

Speaking of Accountants!

RECENTLY we quoted some paragraphs written by an important automotive production executive giving his opinion of the attitude of management toward minor production executive personnel and promised our readers a few more paragraphs from this same executive on the subject of accountants.

We'll be glad to hear from the other side of the case should anyone disagree with this executive's ideas—and we are sure some will.

"Accountants," he says, "are frequently the muscle men of management who help to make life miserable for the production man. Accounting charges the production department with many costs which should go to management itself. Machine equipment which has long since amortized itself is charged as overhead against production when every hour's work it gives is just so much velvet. Machines which have become obsolete because of new development—or because sales have not reached anticipated volume—and expensive tooling which is for small production are charged against production just as though the production manager had been fully responsible for them.

"Money wasted trying to run machines and tools that belong

in the scrap heap or in repairing tools that should be replaced ought not to be charged against production, but against management where it belongs . . . Can management overlook the fact that production executives, who usually are blamed for all the faults in industry, are not judged by correct figures and facts?"

Strong words those. Let's hear from those who think he's right or wrong!

* * *

Independent Suspension Takes Front Rank

INDEPENDENT wheel suspension is going to outstrip automatic transmission so far as widespread application on 1934 passenger cars is concerned, or we miss our guess entirely.

Strolling about the byways of the industry, one hears independent wheel suspension being shouted about, while questioning is necessary to elicit conversation about automatic transmissions at the moment.

That doesn't mean that everybody has turned his back on this latter development—far from it. It does mean, however, that, for the time being, it isn't in the very front row of technical-commercial interest. N.G.S.

New Federals Have

Particular stress laid on reduction of vibration and noise in design of new units

LARGER Hercules engines are used on all of the three new Federal trucks which were announced in *Automotive Industries* of June 17. These engines, while similar in design, have different piston displacements, the bores being different, and all are governed at 2600 r.p.m. Their crankshafts are carried in seven bearings.

In the design of the new trucks, particular attention was given to the reduction of maintenance requirements, and to the elimination of vibration and noise, as part of a program to enhance driver comfort. Twelve lubrication points were eliminated at the springs by mounting the fixed ends in rubber bushings, shackling the front ends of front springs in rubber, and adopting the floating type of support for the rear ends of rear springs, as in the larger Federal models. Universal joints in the new models will require little attention, as they are of the Spicer needle-bearing type.

Problems of vibration and noise have been attacked in a number of different ways. In the first place, the engines are rubber-mounted at three points. At the front there is a trunnion which is carried in a rubber ring locked under pressure in a bracket on the forward cross member of the frame. At the rear there are two points of support, bonded-rubber-plate mountings being used. These are so designed that the engine arms are piloted at top and bottom by ears on the mounting plate. In this way the engine retains considerable value as a cross member of the frame. This design, which follows successful passenger-car practice to some extent, effectively insulates the

frame and cab against noise and vibration.

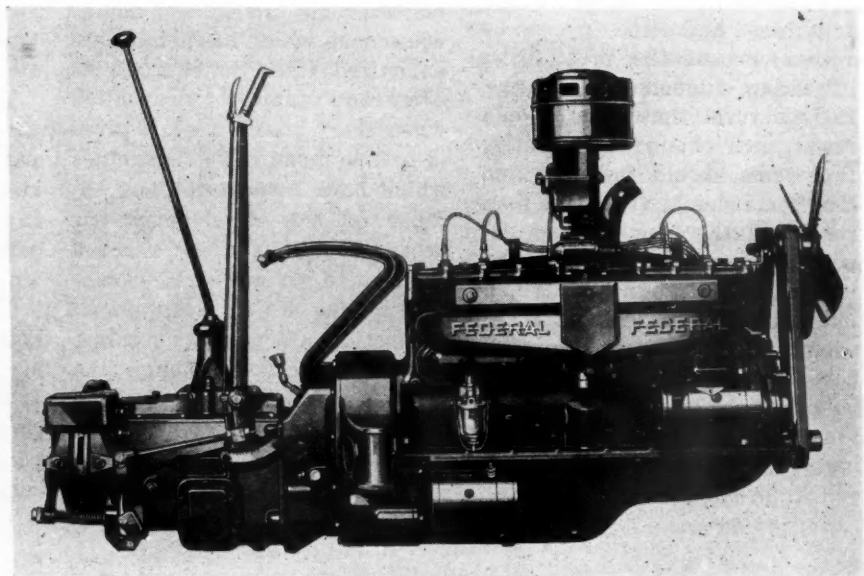
The muffler also is supported in rubber at both front and rear, to provide enough flexibility in the mounting to take care of engine movement, and also for silencing purposes. Fans run at crankshaft speed, this relatively low speed having been made possible by enlarging the size of the radiator cores. Lower speeds, aside from reducing the noise of fan operation, reduce the power absorbed for a given rate of air delivery and therefore increase the efficiency of the powerplant.

There are several other points of interest in the cooling system. A baffle plate extends almost the

whole width of the radiator header tank, its object being to direct the water coming from the engine into the core. The overflow is provided with a shield, to guard against unnecessary loss of water. Inlet pipes to the radiator are large in diameter, to decrease the velocity of flow into the header tank, and outlet connections are so shaped as to facilitate flow.

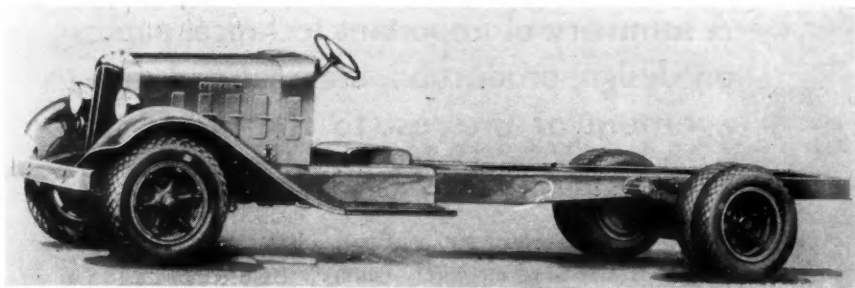
A combined air cleaner and intake silencer is fitted to the Carter downdraft carburetor. Earl Winans, chief engineer of Federal, states that by properly shaping the connecting pipe between the silencer and carburetor, an increase in horsepower was obtained over that available with the carburetor alone. Such installations are usually expected to absorb from 1 to 3 hp. at full engine load.

Cabs have been lowered some 2 in., largely as the result of a change in the general chassis design which permitted of lowering the fuel tank between the side



Powerplant of the Model 25A truck comprising a Hercules engine and a Clark 5-speed transmission.

Larger Engines



Federal 2-ton truck Model 20A. Note deep frame section, helper springs, low location of fuel tank, etc.

rails, instead of placing it on top of the frame. The fuel tanks are larger and are now filled from outside the cab.

Cowls are fitted with three ventilators, one on top and one on each side. As far as the writer knows, these are the first trucks by a major manufacturer which have cigar lighters as standard equipment. Accelerators are of the large-treadle type. Cushion springs are provided with snubbers, as on some passenger cars, to prevent jouncing.

Power plants are set at an angle of $1\frac{1}{2}$ deg. to the frame, to give an approach to a straight-line drive and reduce loads on the universal joints. Clutches include coil-spring vibration dampers. On the 15A and 20A the transmissions are similar to the units formerly used, while the 25A has a five-speed Clark transmission with two pairs of helical silent gears, similar in design to the unit used in the 3-ton A-7 model.

Rear axles on the 15A and 20A are also similar to those previously used in trucks of the same tonnage rating, while the 25A has a Clark 640 of higher capacity and similar to that used in the A-7, except for gears.

Brake drums of all three models are now of cast iron. Wheel fight has been reduced by shackling the front springs at the forward end. The $2\frac{1}{2}$ -ton 25A carries a Tru-stop emergency brake at the rear of the transmission.

Frames on all three models have side rails of $\frac{7}{32}$ in. stock, with a section $\frac{8}{16}$ in. deep and with

$2\frac{7}{8}$ -in flanges, as compared with rails of 6-in. depth used in previous models. Running boards, instead of being supported by brackets from the near side rails only, are carried on outriggers that extend from side to side underneath the frame, thus adding to the rigidity of the frame, the running boards and the fenders.

Clark metal spoked wheels are

supplied on the new models, but demountable wheels are also available. The 20A and 25A carry rear helper springs as standard equipment, while on the 15A they are available at extra cost.

In appearance the new trucks resemble the larger Federal models introduced earlier this year. Deeper fenders with integral skirts, and V-shaped radiators with deep grille fronts are outstanding features. Radiator shells, bumpers, windshield frames, headlamps, and the twin-diaphragm horns which are standard equipment on all models, are all chromium-plated.

All three of the new models are available in wheelbase lengths of 137, 153, 162 and 174 in. The 20A and 25A in addition can be had with a 187-in. wheelbase, and the 25A also in a 201-in. wheelbase.

A study of the Federal line of trucks reveals consistent standardization of general design features, with engine sizes, frame dimensions, axles, etc., stepped up from model to model in accordance with tonnage rating. Appearance also has been standardized throughout the line.

Centerless Grinding Solves Difficult Machine Operation

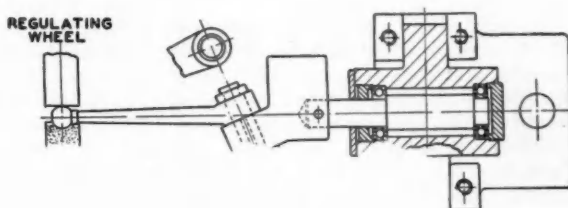
THE centerless method of grinding the ball end of drop forged steel steering arms has proven to be a very satisfactory solution of a difficult machining operation.

A simple fixture is arranged to swivel in a vertical plane for loading the work on a Cincinnati No. 2 Centerless Grinder. The work piece is clamped in place by a quick-acting clamp and "U" washer, lowered into place on the grinding support blade and ground by the infeed method. Some end play is

provided in the trunnions to allow for movement of the regulating wheel and variations in the work. The rotating member is mounted on ball bearings. An Aloxite Rubber Bond grinding wheel 20 in. x $1\frac{1}{2}$ in. x 12 in. 80-KC is used and is trued satisfactorily by a radius truing attachment.

By this method, it is said to be possible to remove 0.005 in. to 0.007 in. of stock in one cut and produce 190 pieces per hour with a good commercial grinding finish.

Set-up for centerless grinding of steering arms



Automotive High Spots at A

A summary of important technical papers on design, production, material and management of interest to the industry's engineers

PRODUCTION, management and engineering papers read at the Chicago Century of Progress Exposition during Engineering Week, June 26, under the auspices of the American Society of Mechanical Engineers developed many ideas of interest to the automotive industry. These included such matters as management control, metal cutting research, a new X-ray technique for inspecting welds, a picture of the present state of development of cemented-carbide tooling, high temperature cooling, and progress in material development and use.

Malcolm F. Judkins and William C. Uecker, both of Firth-Stirling Steel Co., presented a complete picture of the present state of the art of the manufacture and utilization of cemented-carbide tooling in their paper, "Cemented Carbide Cutting Tools." In Table I, the authors give the current recommendations for many commonly used materials. Data concerning tool forms, speeds and feeds, as well as the suitable cutting fluids which is given should be of great value to production men.

Cutting Steels

Recognizing the problem of cutting various types of steels, the authors mention the activity in developing grades of cemented carbides that will handle certain applications satisfactorily. At present, a grade containing tantalum carbide has found wide application; new grades are being developed to suit a wider range. Experimental data bearing on tool life indicates that while relatively large differences in depth of cut produce only a slight shortening of tool life, small differences in feed shorten the life materially.

Recognizing the growing importance of the new engineering materials which are the products of constant research on the part of many organizations, J. L. Alden, of the Western Electric Co., discussed the engineering and economic aspects of the situation in his paper, "Substitution of Different Material in a Product."

Among the valuable materials which have recently become available are the new high-strength, corrosion-resisting steels; improved synthetic plastics; the precipitation hardened non-ferrous metals and alloys; the high-strength cast iron; the magnesium and beryllium alloys; high strength glass and ceramic materials;

and the almost perfectly pure metals for commercial use. Among the latter we might include such materials as pure zinc and the resulting zinc alloys, also new alloys of aluminum. Despite the research activity in this field, the author feels that product engineers are sometimes several years behind the procession in the matter of adapting both present materials and the newly available materials to their best advantage.

Expanding upon a recent news announcement, Herbert R. Isenburger of the St. John X-Ray Service Corp., described a cheap, sensitive X-ray paper and its application in his paper, "Recent Progress in X-Ray Inspection of Welds." The use of this film in conjunction with new X-ray equipment designed especially for industrial purposes renders X-ray inspection of welds less expensive and thus clears the way for wider applications of this method.

"Since the new X-ray paper is coated on only one side, the front screen was eliminated and the emulsion side of the paper was kept in intimate contact with the intensifying screen. In all X-ray pictures the 2 per cent marker was plainly noticeable. The quality of these negatives is as good as film negatives made under identical exposure conditions. The use of X-ray paper has great advantages over celluloid film. The price for paper is less than half the cost of film. Instead of a pair of costly intensifying screens, only a single screen is required—unless one wishes to expose two sheets of paper simultaneously, in which case two screens are used in front of each other, with the rough, uncoated side of the paper facing the X-ray tube. This has the added advantage that one negative can be retained while the other one goes along with the material. Paper will dry faster than film, is easier to handle, and is safer to use."

J. A. Paasche, President, Paasche Airbrush Co., described briefly but comprehensively, the progress and the present state of development in the field of air finishing in his paper, "Compressed-Air Equipment for Fin-

ishing." He described a line of manually operated air-guns ranging in air-consumption capacities from $\frac{1}{2}$ to 54 cu. ft. of free air per minute. He also pointed to the invention of dual, triple and quadruple head airguns for the application of several different materials or colors at one time. A survey conducted among about a hundred miscellaneous manufacturers showed the average saving from the use of air painting equipment to be 78 per cent, representing the saving in time and material only, without overhead and other factors which enter into production costs.

Air Finishing Problems

According to Mr. Paasche the important features of the method are: (1) Design and construction which eliminates clogging of the stickiest materials even if left standing on the air gun lines for weeks at a time. (2) Convertibility of air and fluid parts for use with the lightest to the heaviest materials. (3) Complete interchangeability of standard parts. (4) Dependable and instant control of air fluids for the finest tinting to the heaviest coating, perfectly atomized. (5) Air-conditioning equipment with single or dual regulation that will supply clean dry air without fluctuation after permanent setting. (6) Pressure tanks with safe, quick removable clamp covers, capable of holding high pressure without leakage. (7) Fireproof ventilating equipment that protects health of operators and eliminates fire hazards. (8) Ventilating booths, ducts, and hoods should be smooth inside, without joints protruding, to facilitate ease of cleaning. (9) Air compressors for high-class finishing requirements should be equipped with air filters and leakproof piston rings and air lines with separators or traps.

"Utility of Variable-Displacement Oil-Pressure Pumps," by Elek K. Benedek, of the Hydraulic Press Mfg. Co., describes in detail the theory and application of variable displacement pumps or generators which form the primary part of a complete hydraulic energy transformer, the secondary

A. S. M. E.'s Engineering Week

part of which is a hydraulic motor. This paper is of particular interest because of the increasing utilization of hydraulic mechanism for many types of modern production machinery such as presses, grinders, etc. The author brings out the interesting point that a well-designed hydraulic transmission will run smoothly and silently even when it is used for a very slow cycle. This feature is utilized in sensitive and high-grade grinding finish, where the chatter marks of gears on the work are objectionable.

"At overloads, the hydraulic transmission has the characteristic of a friction coupling, and it protects the machine from hard or unskilled operation and breakage. Since they are stepless in speed ratios, they are applicable to vehicles and all kinds of automotive drives, in which cases they are particularly useful and simple as starting means, without a starting coupling. They are reversible with

the simplest type of movement and control mechanism."

An important contribution to welding literature is made by D. I. Bohn and G. O. Hoglund, both of the Aluminum Company of America, in their paper, "Resistance Welding of Aluminum and Its Alloys."

"Spot and seam welding of aluminum and its alloys requires primarily the establishment of methods which will provide a high thermal gradient from the point of weld to the sheet surface. These conditions do not necessarily obtain with steel welding, and in addition a weld in aluminum alloy is made with the metal in a molten state, which also is not necessary with steel. Theoretically, these conditions could best be obtained from an infinitely large shot of power for zero time. Such conditions are approximated by using heavy current and a short and synchronously controlled time. Conventional automatic spot welders, as used for steel, do

not provide the necessary electrical control, either with respect to the duration of power in seconds or synchronism. Lack of consistency therefore characterizes most of the results obtained when using unaltered, existing spot- or seam-welding equipment designed for steel. Electronic control of the power supply is used for both spot welding and seam welding, and provides this necessary synchronous power application."

A spot-welding method not requiring synchronous control is discussed, the power being cut off when the weld is completed by the inherent design of the electrode used. It is not, however, as readily applicable to all forms of fabrication as is the one demanding synchronous control, but is an excellent method of economically using existing equipment with but little expense where its limitations are not too serious to prevent its use. Pressure between electrodes, either with spot welding or seam welding,

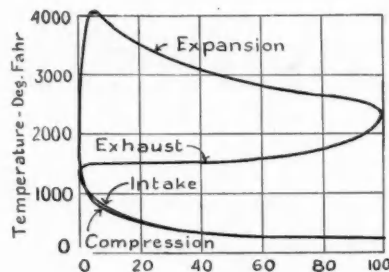
Table 1—Recommended Tool Angles for Various Materials

These data are based on turning with lathe tools at approximately 1/8-in. cut and 1/32-in. feed per revolution, except as noted

Material Cut	Tensile Strength Thousand lb. per sq. in.	Recommended tool angles			Cutting Speed ft. per min.	Recommended Cutting Fluid
		Clear- ance	In deg. Side Rake	Back Rake		
Cast iron 150-170 BHN.....	18-26	4	10-12	0-4	275-350	
C. I. 1.5% Ni 170-195 BHN....	20-28	4	8-10	0-4	250-300	
S. S. 20-30% steel scrap 2% Si 170-195 BHN.....	30-36	4	6-8	0-2	175-250	
C. I. 1% Cr. 3.5% Ni 210 BHN..	30-36	4	4-6	0	150-200	
Malleable C. I.		5	10-12	6	175-250	
SAE 1112 Bess. screw stock....	70-90	5-8	12-20	6-10	300-400	
SAE 1120 O. H. screw stock....	70-85	5-8	10-16	5-8	275-350	
SAE 1020 soft forging.....	63-80	4-6	10-14	5-7	250-300	
SAE 1035	75-90	4-6	10-12	5-6	250-300	
SAE 1050	80-100	4-6	10-12	5-6	175-250	Emulsion
SAE 2315 gear blanks.....	80-115	4-6	10-12	5-6	150-200	Emulsion
SAE 3120	80-110	4-6	10-12	5-6	150-200	Sulfurized mineral oil
SAE 52100	100-125	4-6	10-12	5-6	150-200	Emulsion
SAE 6150	125-150	4-6	8-10	4-5	125-175	Sulfurized mineral oil
18 Cr 8 Ni stainless.....	85-110	4-6	10-14	5-7	150-200	Sulfurized lard oil
Hi C Hi Cr stainless valve seats	100-125	4-6	8-10	4-5	100-150	Sulfurized lard oil
Pure cast aluminum No. 43....	19	8-10	12-16	25-40	500-1000	Kerosene
Dural No. 17 ST.....	58	8	0-3	6	200-300	Kerosene
Alcoa No. 132—LoEx.....	30	6	8-10	14-18	300-500	Kerosene and lard oil
Rolled copper	30	8-12	18-25	4	300-500	Dry or sweet milk
Cast yellow brass.....	25	6-8			500-800	Paraffin oil
Bronze, hard cast SAE No. 62...	30	6	6-10	0	250-400	Paraffin oil
Phosphor bronze SAE No. 64...	25	6	4-8	0	150-300	
Glass (drilling).....					75-150	
Unfired clay and porcelain....		15-30		10-15	300-500	
Copper & mica commutators....		8-10	16-20	10-15	300-500	
Bakelite.....		8-10	8-12	4-6	500-800	
Casein products.....		8-12	4-6	0-3	300-500	
Hard rubber.....		8-10			300-400	

Chilled Cast Iron Rolls. 10-20 F.P.M. 3 deg. clearance. 0-3 deg. back rake. No cutting fluid used.

This graph, illustrating Mr. Caminez' paper on Cooling Problems shows the temperature cycle of the gases in an engine with 5.8 compression ratio and designed for an i. m. e. p. of 200 lb. per sq. in.



plays an important role and must be maintained constant for any given adjustment. The effect of varying pressure with respect to power required and consistency of results is discussed, as well as the surface condition of the sheet resulting from fabricating and heat-treating methods. The latter has an important bearing on the desirable pressure and the results obtained.

The principles which have been employed for successful butt welding are also covered, this method being quite similar to that employed for steel when the flash method is not used. No consistent or satisfactory results have been obtained with any flash-welding method similar to that employed with steel, although such a method would be desirable from many standpoints.

Eugene Szepesi in his paper, "Principles of Coordinated Visual Control," describes the development over a period of years of a technique and a series of devices for producing management control charts. This includes methods of quickly recording all original data of transactions, needed for continuous current control, and devices for keeping them visibly before the executive. The major device consists of a calibrated ribbon running in a permanent channel in such a way that measurements extending twice its length can be obtained. Coloring various parts of the ribbon according to predetermined points enables automatic classifications of phenomena, such as sales velocity, or can give the executive warning when undesirable conditions are foreshadowed. It may be applied to an almost unlimited range of conditions, in manufacturing, distribution, trading, and finance.

It is claimed by the author that this technique will be a great aid to management and sales executives in adjusting their operations to trends not only in their particular industry but in the general, economic field. Mr. Szepesi feels that the present data which management uses for attempts at control are inadequate and practically useless. He recommends a procedure of recording immediately such necessary data as sales which show proper analysis and develop not only a current picture of the conditions of the business but will permit a forecast as to direction and control.

"Recent Investigations in Theory of Metal Cutting," by Friedrich Schwerdt, Ord.-Prof. A.D., Technischen Hochschule, Lehrstuhl für Werkzeugmaschinen und Fabrikbetrieb, Hannover, Germany, describes a series of remarkable experiments attempting to provide an explanation for what happens when metal is cut. A straight cutting tool was used operating on a disk so that the cutting edge was parallel to the axis of the work. The chip thus flowed in the plane parallel to the cutting edge of the tool. An unusually heavy lathe was employed and a rigid tool mounted with as little overhang as possible. A Widia tool was employed which showed no appreciable wear during the experiment. Under the condition of high speed cutting, the only possibility of making visible the processes which occur is by means of the spark photograph, which method was applied by the author. It was found necessary to develop special photographic and lighting equipment since the exposure must be made in 0.000001 second. After considerable experimental work, a sufficiently bright light source was obtained by using the discharge of condensers operating at a tension of 50,000 volts with instantaneous current from 10,000 to 20,000 amps.

As a result of this investigation the following fundamental facts are recognized: "The formation of the 'built-up edge' was examined in detail. These examinations show that the built-up edge, contrary to general opinion, does not occur at high speeds. With photographs taken after the machine was stopped, it would appear that the built-up edge would always occur, because in stopping the machine there was always time for the loading to form. With the present method, this impression was corrected, and quantitative determination made for different materials, as to the speeds beyond which the built-up edge does not form. Examinations also showed that the built-up edge changes its size in periods of time of several thousandths of a second. The growth of the pile occurs by means of a continuous accumulation of new flakes on the pile. The pile penetrates into the work, the pressure deforming the adjacent material. At the slower cutting speeds, the pile periodically wastes away by a breaking off of

groups of these flakes by the chip; also, portions are carried away by the cylindrical surface of the work. At higher cutting speeds, the wasting away occurs by a periodic carrying away of the whole pile with the chip.

"The condition of the surface left by the tool is of great importance to the machinist, and the relationship between chip formation and surface condition was studied, at various speeds. Whenever the built-up edge occurs, the surface of the work is always distorted. At the lower cutting speeds, there are irregular scales on the surface; with medium speeds, there are alternately rougher and smoother portions corresponding to the change in size of the built-up edge. High cutting speeds, at which no built-up edges are formed, give smooth round surfaces. With brittle materials, there occurs mostly a preliminary cleavage, a tearing and crushing of the material without the formation of the built-up edge. The built-up edge may also occur with these materials, however."

Aircraft Engine Cooling

Now that the speeds of commercial airplanes are approaching 200 m.p.h., it is necessary to study very carefully the various items contributing to the drag. In a paper on the Aircraft Engine Cooling Problem, Harold Caminez of the Allison Engineering Co., Indianapolis, stated that tests made by the N.A.C.A. showed that in airplanes designed to fly at such speeds the drag due to a radial engine with even the best types of cowling may consume about half of the engine output. Some British test results show that in a 150 m.p.h. airplane the drag of a water-cooled engine with its radiator is about one-half that of a cowled air-cooled engine in the same installation.

The drag of the air-cooled engine is set up by the engine itself, while the drag of the liquid-cooled engine is necessitated only by the drag of the radiators. A comparison of the radiator size required for various liquid-cooled engine installations of the same power output therefore will show directly the relative drag due to the engine.

Tests on the heat rejected to the coolant in a modern high-temperature liquid-cooled engine disclose that smaller radiators are required for a given power when the engine is designed to operate at high specific outputs. Rich gasoline mixtures also reduce somewhat the heat rejected to the cylinder walls. However, the coolant temperature has by far the greatest influence on the required radiator size, since the temperature of the coolant affects both the amount of heat rejected and the temperature difference between the radiator and the cooling air blast. Curves of comparative radiator sizes for various

coolant temperatures show that with coolant-output temperatures of 300 deg. F., the radiator size, depending on the installation, can be 22 to 30 per cent of that which would be required with a water-cooled engine of equal power output. The drag of an air-cooled engine installation increases about as the square of the speed, since the engine frontal area cannot generally be modified to meet the requirements imposed by airplanes of different speed ranges. With the liquid-cooled engine the radiator size and construction can be altered to suit each particular airplane, so that the drag of the liquid-cooled engine installation increases with speed at a much lower rate than that of the air-cooled installation. For all high-speed installations the use of the liquid-cooled engines, especially of the high-temperature type, is therefore deserving of particular attention.

Electric Cast Iron

The very exacting requirements of the automotive industry have forced the improvement of cast and malleable iron, both plain and alloyed, and their heat treatment, according to H. H. Walther, metallurgist of the Dayton Steel Foundry Company, Dayton, Ohio, who read a paper on Electric Cast Iron Practice. Mr. Walther said that today the electric furnace can produce consistently plain irons of from 35,000 to 45,000 lb. per sq. in. tensile strength, and alloyed irons of from 40,000 to 65,000 lb. per sq. in. and even alloyed irons which when properly heat treated will show in excess of 100,000 lb. per sq. in. and an appreciable elongation. While these irons are all in commercial production, and when judiciously selected give every satisfaction, it has been the experience of foundrymen that many engineers, learning of the high-strength irons available today, blindly specify that a part shall be made of a 45,000 lb. iron when such a value is unnecessary and the increased cost of the metal and the increased time required for machining make it prohibitive for mass production. On the other hand, many parts that are now made of ordinary iron might be redesigned to take advantage of the high-test irons, and the saving in weight of from one-half to one-third would result in a desirable economy.

Furthermore, many engineers still specify that all test bars shall be cut from the 1 1/4-in. cast bars. This practice is unfair, Mr. Walther said, for a test specimen cut from this bar may show only 45,000 lb. per sq. in., whereas a specimen cut from the casting, such as a 5/16-in. brake-drum section, would show from 55,000 to 58,000 lb. per sq. in. for the same iron.

The plant with which the author is connected specializes in the production of steel wheels for automobile

trucks and buses and molybdenum-alloyed cast iron for brake drums, clutch plates, etc. These metals are melted in either of two three-ton-per-hour, three-phase, direct-arc 'Lectromelt' furnaces. The furnaces are used interchangeably for the alternate production of cast iron and steel. No precautions, other than the self-evident one of completely draining the furnace before charging the following differing heat, is necessary for such a diversified production. Furnace control for electric cast iron is very simple, the melting practice being analogous to that for electric steel. The charge is so adjusted that it will finish at the desired carbon, but at a somewhat lower silicon than required in the finished casting. When a temperature of 3000 deg. Fahr. has been attained, a preliminary test is taken. This is the familiar chill-wedge test and is eminently suitable for all control work. In experienced hands it is so reliable that there is no excuse whatsoever for pouring an off-analysis heat. The carbon-silicon ratio having been adjusted by this test, the furnace is tapped and the metal poured at 2750 deg. Fahr.

Stainless Steel in Aircraft

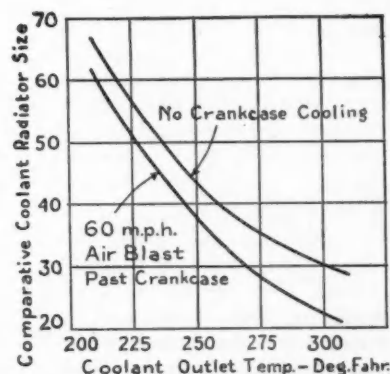
Stainless steel is being used to a considerable extent now in automotive production. In these applications it comes into competition chiefly with aluminum, and a comparison of stainless steel and aluminum in aircraft production was made in a paper presented by Frederic Flader, aeronautical engineer of the Curtiss Aeroplane and Motor Company of Buffalo. The comparison is made on the basis of four criteria determining the value of a material for structural purposes, viz., (1) tensile strength, (2) yield point in compression, (3) the strength of long columns, and (4) strength in bending. The finishes which are necessarily employed on aluminum alloy as corrosion preventives are charged against that material.

The following comparison between the weights per square foot of va-

rious thicknesses of aluminum alloy and stainless steel is based on equal tensile strength of a specimen of each material, taking the unit strength of aluminum alloy as 55,000 lb. per sq. in., and the unit strength of stainless steel as 175,000 lb. per sq. in. The paint required on the aluminum alloy is considered to be one coat of iron-oxide primer and two coats of navy gray enamel on one side, and one coat of primer and one coat of aluminum bituminous paint on the other side. The weight of these coverings per square foot of sheet is 0.079 lb. Upon this basis it is computed that a width of stainless steel of the gage which is equivalent in tensile strength to 0.012 aluminum alloy is 61.1 per cent as heavy as the aluminum alloy. The corresponding figure for 0.072 aluminum alloy is 82.7 per cent, while the gages in between these two extremes show correspondingly graduated values. This comparison indicates that stainless steel has a definite advantage when used in tension.

In short columns the yield point in compression is considered a criterion of the structural suitability of a material. The yield point of aluminum alloy is taken as 40,000 lb. per sq. in. The yield point of hard-rolled 18-8 stainless steel is taken at that point when the stress-strain curve departs from a straight line 0.002 in. per in. This is 140,000 lb. per sq. in. from reliable test data. The ratio of these figures is 3.5, while the ratio of the weight of stainless steel to that of aluminum alloy is 2.83. From tests of the strength of columns made of the two materials the following results have been found. The aluminum-alloy columns are round tubing. Stainless-steel columns equivalent in weight to 1/2 in. 0.035, 1 in. 0.049, 1 1/2 in. 0.065, and 2 in. 0.095 aluminum alloy were selected in lengths in which L/p varies from 10 to 100. The aluminum-alloy tubes are considered painted in accordance with navy standard practice. The results indicate that the stainless-steel members are approximately 20 per cent stronger than aluminum alloy in small sizes, and about 10 per cent stronger in the larger sizes at all values of L/p .

This graph, from Mr. Caminez paper on Cooling Problems, shows how the required radiator capacity varies with the temperature of the cooling fluid at the jacket outlet



Trend to Smoother Body Exterior

by Joseph Geschelin

Engineering Editor, Automotive Industries

LITTLE niceties, not of the gadget type, in the design of modern automobile bodies will yield big dividends in appearance, in the opinion of outstanding industrial designers. One which was first impressed on our mind by Henry Dreyfuss is the use of flush or concealed door hinges—the kind that do the job but don't show.

With designers working consistently for some new form of expression, perhaps leading to some modified streamline form, there is a noteworthy tendency to simplicity of line and a general cleaning up of external surfaces. This is evident on the present crop of cars in the removal of bright cowl bands, the shifting of cowl lamps to fenders, the retreat of gadgets to the interior. It is even more studied on the Pierce - Arrow streamlined model which features flush type external hardware.

Door hinges mean more in the picture than we realize at first glance. They can be made to do things to body lines. And their influence becomes more marked as the metal stretcher's skill produces greater turn-under in body panels and increased convexity in door panels. Under these conditions the bottom hinges stick out far enough to be used as tow hooks.

Flush or concealed door hinges take the warts off the sides of the body and bring out the lines in their true form. They make it possible to close up the joints between the door line and pillars, practically eliminating the long vertical lines which usually give the impression of height and thus contribute to an appearance of fleetness coupled with lowness.

Some engineers feel that the change may bring up new production problems. Chief of these might be the need for closer tolerances in hanging doors and the necessity for closer control of door openings and door contours. It is even conceivable

that at the start only the cars in the higher price brackets could afford to take advantage of the new idea. But the production problems are not insurmountable — cooperation between the hardware maker and factory production man might iron out the early applications with credit to all concerned. It has been done before. As a matter of fact the right kind of hinge offers advantages which may outweigh other considerations.

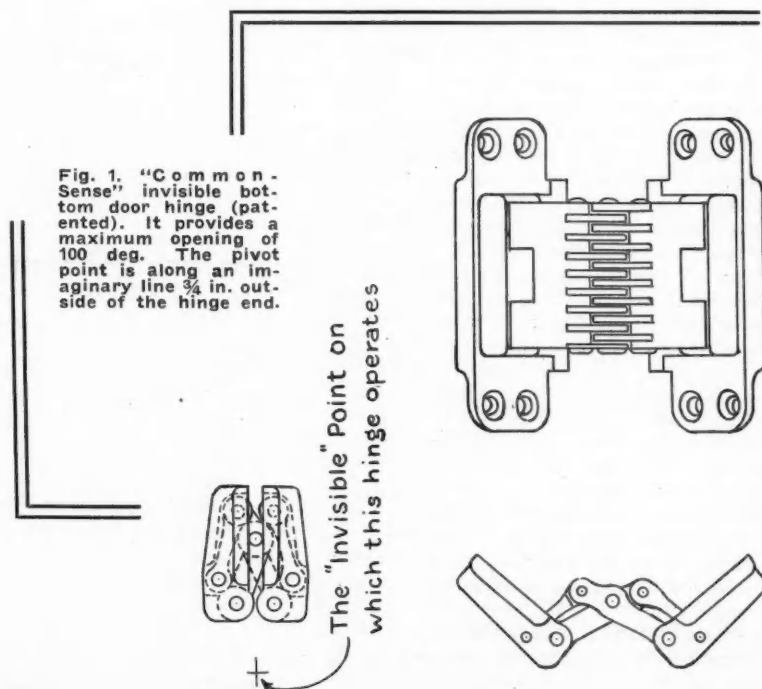
Henry Dreyfuss has several suggestions which might well fit into a program of body refinement. One of these is the development of some form of safety switch incorporated in the door hinge or door handle which would make it impossible to start the vehicle unless all doors were closed. Sounds like a good sales feature.

The other idea is more for the custom-built job. How would it be

if the chauffeur could open the doors automatically, simply by pressing a button! This would make it unnecessary for him to run around the car as is customary, and would add to the smartness of deluxe equipment.

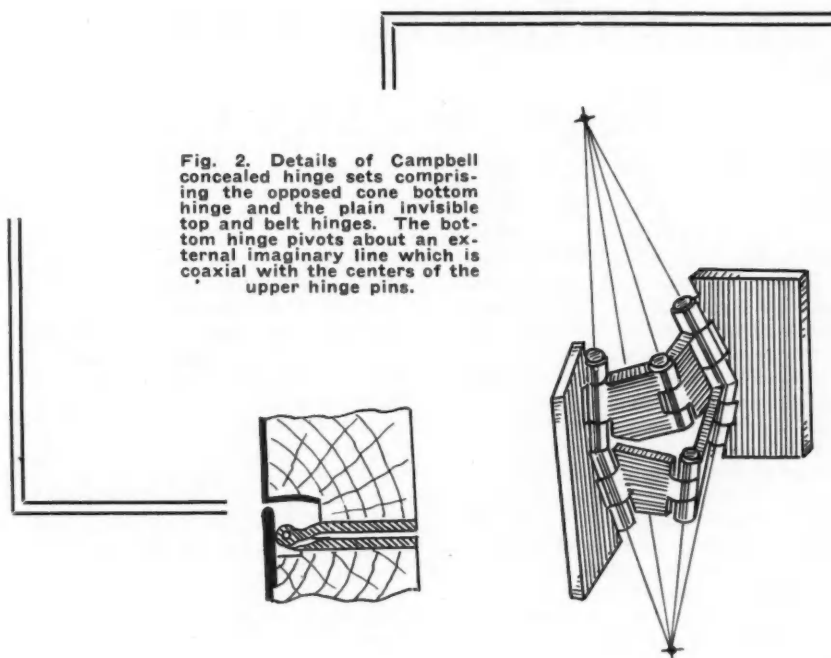
Much more experimental work has been under way than is evident on the surface but complete returns are not available for publication for the time being. However we have just received complete details of a concealed hinge design of unusual interest which is to be placed on the market by Ackerman-Blaesser-Fezzey, Inc., of Detroit, makers of the well-known "Common-Sense" window regulator. This hinge, as well as several others, will be described here.

The "Common - Sense" invisible hinge shown in Fig. 1. permits a maximum door opening of 100 deg., the effective pivot point being located as shown, along a line $\frac{3}{4}$ in. outside of the hinge line and parallel to the hinge pin axis. While the hinge is said to have exceptional strength and is provided with a positive stop at maximum opening, the makers recommend the



Favors Flush Type Door Hinges

Fig. 2. Details of Campbell concealed hinge sets comprising the opposed cone bottom hinge and the plain invisible top and belt hinges. The bottom hinge pivots about an external imaginary line which is coaxial with the centers of the upper hinge pins.



use of separate door stop in the interest of safety.

Hinge leaves are of the zinc alloy die castings testing over 47,000 lb. per sq. in. in tensile strength. The compound links are of hard rolled, cold rolled steel, cadmium plated. The seven hinge pins are of cold drawn steel while the bushings are of hard rolled brass. The hinges are interchangeable since no rights or lefts are required.

Another design, with which many body engineers are familiar, is Campbell opposed cone bottom hinge, made by A. S. Campbell Co., East Boston, Mass. The construction of and application of this hinge are shown in Fig. 2, which also gives the details of the plain concealed hinge used at the top and belt.

As shown in Fig. 2, the bottom hinge has two sets of opposed converging-joint links which carry the weight of the door in all positions. In operation the bottom hinge, while concealed inwardly of the outer face of the door, swings about

a fixed, unshifting center outside the turn-under of the door and coincident with the axis about which the belt and top hinges swing. This means that the weight of the door is carried equally by the three hinges. Installation of Campbell concealed hinges does not weaken body members—since it is not necessary to cut away door flanges as is the case with hinges that project outside the body. Door pillars retain all their inherent strength because these hinges are engineered into the body as integral parts.

A simple solution for a light "butterfly" door with the modern inclined line is found in Fig. 3, which is taken from *The Automobile Engineer*, January, 1933. The body evidently has practically no turn-under so that a special bottom hinge is unnecessary. The feature of this construction is that the hinge pins are concealed and the cowl panel is recessed to receive the outer hinge leaf. By carefully controlling the size of the recess, the hinge joint is quite unobstructive when the door is closed.

The body is a two-seater coupe of Italian make and mounted on an Alfa Romeo chassis.

While it is true that the use of concealed door hinges may bring up some new production problems at the start, the advantages to be derived should outweigh these questions by many jumps. As a matter of fact certain advantages stand out rather prominently. One of these is the fact that the body can be striped and polished mechanically without interference from projecting hinges. Moreover, touching-up around the hinges is entirely eliminated.

Concealed door hinges should enable the designer to achieve cleaner smoother lines not only because the projecting hinges are absent but because the doors fit closer and the vertical breaks in the body lines become practically unnoticeable.

Then through the use of unique color treatment and striping it will be possible to achieve the smooth, fleet, low-hung appearance that has been the objective of designers these many years.

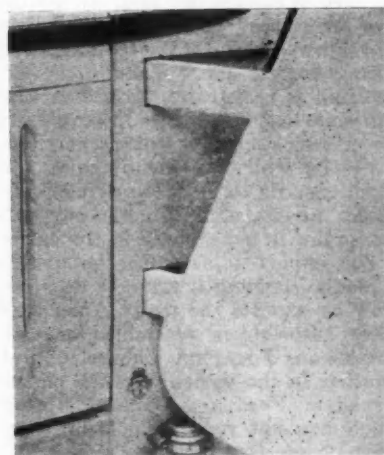


Fig. 3. Door hinging on Italian body mounted on an Alfa Romeo chassis. Hinge pins are concealed, the external leaf fitting into a recess in the cowl panel.

(From *The Automobile Engineer*, Jan., 1933)

The FORUM

Do Trade Barriers Cut Automotive Exports?

TO THE EDITOR,
Automotive Industries:—

The very interesting article on world motor vehicle production by Mr. C. F. Baldwin, assistant chief, automotive division of the Bureau of Foreign and Domestic Commerce, in the June 3, 1933, issue of *Automotive Industries* has just come to my attention. I have read it carefully and, of course, agree very thoroughly with the statistical information compiled by Mr. Baldwin and the statements made in his article. However, I do feel it desirable to object, first, to the interpretation you have put in the headline, "Trade Barriers Cut America's Share of World Motor Markets," and, secondly, to Table II, which gives production and exports of the various producing nations.

The implication of your headline is that, because of artificial trade barriers erected against the United States, American automotive production was reduced in 1932 to 72.4 per cent of world output from the 88.3 per cent of 1929. There has been, as we know all too well, a marked decrease in United States and Canadian production but, after all, the decline has been due to the falling off in domestic demand and home market sales. It is obvious that, because of the depression, Americans—like motorists in other parts of the world—have not replaced their automobiles as promptly as they formerly did and, by adding two or three years to the lives of their vehicles, total production has been lowered. What caused the depression is, naturally, a subject that will wear out our brains in perplexity for a long time but that trade barriers—by which we mean import restrictions, foreign exchange controls, higher tariffs, etc.—brought our output so low is not strictly in the cards.

The export table with the article is also misleading because it does not show as exports the many American-made automobiles assembled abroad. This means Fords and Chevrolets, put together in the various branch plants abroad of Ford and General Motors which are not reported, officially by Washington as exports but which are included in the over-all figures for our total output. Such assemblies in 1932 were slightly over 50,000 automobiles (cars and trucks) and should be added to the total of 77,866 which your table shows for the United States

and Canadian exports. You will note that Mr. Baldwin speaks of these assemblies several times in his article.

The statistical tables of our car and truck exports have been misleading for some years, because of this assembly situation. Washington very properly reports only complete vehicles shipped abroad as our exports. In most Washington statements, unless it is stated to the contrary, sales in Canada and exports from Canada are not included, and it is always difficult to say just what the total of unreported assemblies is in any given period. The National Automobile Chamber of Commerce, in its yearly reports, gives "sales of American-made vehicles outside of the United States," as exports. This again is another total, as it includes all American automobiles sold and produced in Canada, assembled abroad and exported from the United States as complete vehicles. It is much higher than exports as given by Washington or any other sources.

From all of this, our best indication is that actual export sales of American automobiles have stood up through the depression just as well, relatively, as have domestic sales. In other words, in the bull-market days up to 1929, we learned that automobile exports were constant at about 12½ per cent of total production; one automobile in each eight was exported. Washing out all confused statistics, we exported about that proportion in 1931 and 1932. Trade barriers abroad were no more harmful to our business than were the trade barriers of decreased purchasing power, closed banks, etc., in States like Iowa, Texas, Kansas, or Michigan. We recognize such barriers if they are overseas; but they are just as effective in halting sales, regardless of what we call them, here at home.

Now that recovery seems to be setting in and with the international field more hopefully ahead of us, several misconceptions must be blown away if this great industry is to resume its aggressive export effort,

which was the wonder of the world up to 1929 and which, by its restrained resumption, may make us far more solid and substantial, enduring profits than anything we have yet known. The flat assertion must be made that our 1933 automobiles are further ahead of their competitors of Europe than they were in 1929, when nobody doubted their position. But take them today, now that dollar depreciation has cut their comparable foreign prices by 15 per cent, and compare them, car for car, price for price, model by model, with their European competitors and you will readily see why Australia, South Africa, the Orient, Europe, Latin-America and other parts of the world are turning hopefully to our markets abroad. We have serious problems in the future of our export trade but these are not problems of European competition.

Our European competitors are the makers of Great Britain, France, Italy and Germany. The most energetic are the British and Britain is the only country whose automotive makers have scored any gains in export. But analyze that gain and you will see that a goodly part (not all) is due to our old friends Ford and General Motors. A goodly part (not all) of the increased exports from Britain consists of Fords, going to Europe, and the Bedford trucks and Vauxhall cars made over there by General Motors. Ford, you will recall, shifted his center for European direction and production from Detroit to Dagenham. The effect of that need not be argued but it cannot be doubted. The fact is that the British still retain their old, traditional *pound per horsepower* tax which is just as effective today in keeping their cars out of world markets, in an important way, as it was in 1929 or before, except in isolated spots.

The French makers are turning out good cars but much too high priced for export competition. The Italian industry is turning out good cars and trucks but Italian production, running all plants twenty-four hour shifts,

seven days weekly, would supply only a small proportion of the world demand even in such a year as 1932. That leaves only Germany and Germany's failure to build a bigger producing industry is rather amazing, in view of the undoubted need for automobiles and because of Germany's manufacturing ability. Fortunately, or unfortunately, there is today little vigor in the German industry and German automotive exports are almost entirely once more those of our old friend, General Motors, which has gained considerable acceptance in certain markets for its little Opel.

The foregoing is a factual realization that specific difficulties in each of these competing European countries prevent them from building the automobiles so vitally needed in the export territories. As long as Britain sticks to the present high horsepower tax, her makers must concentrate on small cars or cars of high-speed and high compression engines, not suitable for the export territories. France has high automobile tariffs which has held her home and colonial markets for the French makers and made it unnecessary for them to reduce their prices to competitive levels. Germany, for reasons difficult to state, has been unable to get going on motor vehicle manufacture. The result is that its manufacture, freed from artificial restrictions, is left to this country, in which the automobile has become, because of peculiar domestic conditions, the greatest of all specialty manufactured products. Lest we get too chesty about this favored position, let us recall that these other nations have their own specialties—textiles in England, luxury and style products in France, chemicals, etc., in Germany—which our manufacturers are no more able to supplant. Our continued position in the export field is due to basic conditions of our own home market which our competitors cannot equal. This is not "flag-waving" in any sense and it is recorded in no spirit of patriotic nationalism. The fact is that, in the fourth year of the depression, competition for world motor sales is still basically competition between individual American makers.

The same factors working to restore our domestic automotive business are at work to restore our automotive exports. First of all, 75 per cent, or more, of the millions of American automobiles throughout the world are four years old or older. A huge number, unknown in total but enough to surpass the best export year we have ever had, are seven years old or older and must be replaced. With all the disheartening troubles of the depression, overseas operators of automobiles have tenaciously clung to this modern vehicle of transportation and 1932 saw a diminution of registrations abroad of only 3.1 per cent, less by half than the 6 or 7 per cent reduction here at home. A great total of American automobiles overseas must soon be replaced.

Rising prices for all kinds of commodities are as radically altering the outlook for many foreign countries as are the increases here. Now that Akron's factories are busy, rubber has jumped up to six or seven cents a pound and the Eastern suppliers are beginning to stir again. When Chicago lifts wheat prices, it also lifts the hopes of countless millions in Argentina, Australia, Canada and other parts of the world. Our tin mills are busy once more; the tin producers abroad are earning more and their depression is beginning to solve itself. Rising copper prices are "stop press" news in Chile, Peru, Canada, Africa and other places. Sugar at 1½ cents a pound brings joy to Cubans, Brazilians, Peruvians, Jamaicans, Javans and others. When you read of textile improvement, read into the news more income for the wool producers of Australia, Uruguay, even Turkey and other places. Higher shoe output at Boston, or St. Louis, brings increased hide exports at rising prices to Argentina or Australia and if your cup of coffee, or your morning cocoa, costs more, you are helping the Brazilian, the Columbian, Ecuadorean, West African, and the Central American to buy automobiles, just as higher prices for wheat, corn and dairy products help the farmers of Kansas, Iowa, Illinois, Wisconsin, New York State

and other domestic centers to become "financial citizens" again, able to pay taxes, and mortgage interest, with a little left over for other things.

Export demand for automobiles already has shown some revival and the export managers of the industry—theirs has been a friendless part of the factory recently—are getting their first substantial interest from abroad for a long time. These chaps—and how they know their way around the world and with what ability they can sell—know full well that the unique character of our domestic market enables our industry to produce the automobiles that the world needs and must have. They have kept the flag flying, under every hardship in the days of the depression. So let's give them a hand, not telling constantly and continuously the old thread-bare, many times told story of trade barriers. Let's tell about merchandising efforts, aggressive export campaigns and, above all, a true conception of the fact that exports are coming back just as domestic business is coming back. We want no pollyannas; we want merely an understanding that, isolation or no isolation, millions of people need the good automobiles that we are building in 1933.—George E. Quisenberry, Editor, *The American Automobile* (Overseas Edition) and *El Automovile Americano*.

In the letter printed here, Mr. Quisenberry starts out and ends up with some friendly criticisms of the article on world production in our issue of June 3, taking particular exception to the headline "Trade Barriers Cut America's Share of World Motor Markets." In between, he makes some mighty interesting comments on automotive export prospects.

On his criticisms of the headline, Automotive Industries has the following comments to make:

The headline does not say or imply that export sales have declined proportionately more than domestic sales. Inferentially it does say that shrinkage in production abroad during the depression has been substantially less than in the United States and Canada, which is in accord with the facts.

As to the factual basis for the headline, the following table apparently demonstrates that America's share of world motor markets has been cut:

	1929	1930	1931	1932
World Production except United States and Canada	650,000	616,292	576,289	547,757
Foreign Consumption of Motor Vehicles of U. S. Design except Canada	835,922	450,268	255,130	132,388
Total	1,485,922	1,066,560	831,419	680,145
America's Share of Foreign Motor Markets except Canada—Per Cent	57.3	42.3	30.7	19.5

Whether trade barriers are responsible for this shrinkage is, of course, a matter of opinion.—D.B.

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Self-opening Die Head For B & S Automatics

The Eastern Machine Screw Corp., New Haven, Conn., has developed an H & G self-opening die head for No. 2 Brown & Sharpe Automatic screw machines that will permit threading up to full 1 in. diameter, 2 in. long in both coarse and fine pitches. This die head greatly enlarges the range of work that can be threaded with a self-opening die head on these machines.

The possibility of using a self-opening die head instead of solid dies for threading these large diameters is said to provide many advantages. Since high speed chasers are used, higher cutting speeds are possible. Chasers may be easily resharpened a great many times. It is not necessary to reverse the spindle for backing off.

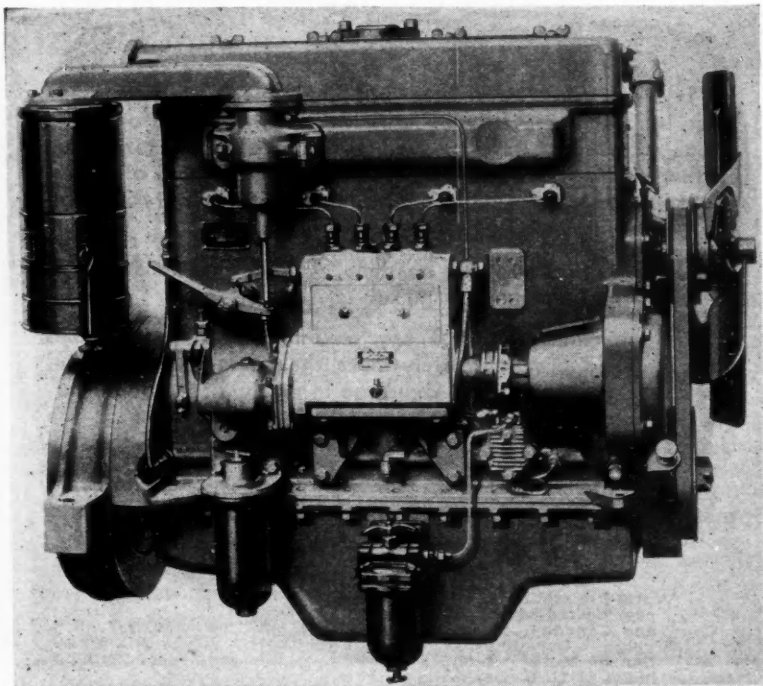
This die head, in spite of the limited outside dimensions, takes the same chasers as used in all 1 in. sizes of H & G Die Heads.

Waukesha Builds Hesselman Engine

The Waukesha Motor Company, Waukesha, Wis., has just concluded

engines for trucks, tractor, and general industrial service.

The Ingersoll-Rand Company have held a similar license for use in portable air compressors, and for more than a year these engines, built by the



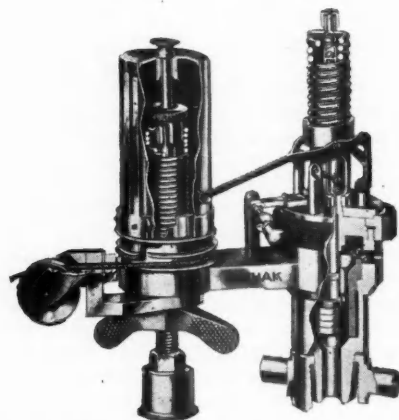
40-hp. engine of the new Waukesha-Hesselman line

license arrangements with the Hesselman Company of Stockholm, Sweden, for the American rights under the Hesselman oil engine patents. Under these patents, they will manufacture a line of heavy oil

Waukesha Motor Company, have been on the market. Several hundred are reported to have been exported to Europe as well as the orient. Fuel economy is said to be 0.53 lb. per bhp.

Pressure-Volume Indicator

Bacharach Industrial Instrument Company, Pittsburgh, Pa., has brought out the Maihak Type 2-CP engine indicator. This is a pressure-volume indicator and is suitable for use on Diesel engines, steam engines, compressors and pumps. Owing to its speed limitations it cannot be used directly on automotive engines, but it evidently can be used in conjunction with so-called sampling valves or



Maihak Type 2-CP engine indicator

stroboscopic valves which place the cylinder of the indicator in communication with the cylinder of the engine to be indicated for an instant during each cycle.

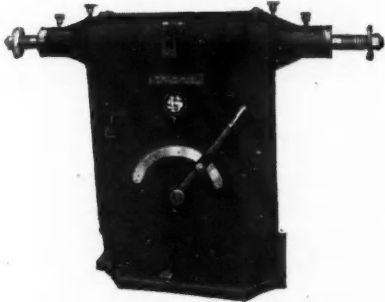
Among the advantages claimed for the Maihak Type 2-CP are that the indicating assembly can be lifted off in a single unit, giving quick access to the piston; that the piston sleeve can be easily removed through the opening made by taking off the indicating assembly; that the drum spring is quickly accessible and easily adjustable to any pressure; that the indicator is compact in design and possesses the necessary ruggedness to stand severe usage, and that the spring may be exchanged without removing any part of the indicating assembly.

45 and 60 Deg. Shop Triangles

Forty-five and 60 deg. triangles are now made in modified form for use in production and tool departments, by The Van Keuren Co., Watertown, Mass. They are made from a close grained, well seasoned cast iron and are provided with slots in each face for bolting together, clamping parts or fastening to the machine. The 60 deg. triangle is approximately of three inch base, five inch height and one and a half inch thickness, while the 45 deg. triangle is of three and seven eights inch base and height and one and one half inch thickness. All faces and angles are ground to a close degree of precision.

Variable Speed for Buffers and Grinders

The U. S. Electrical Tool Co., Cincinnati, Ohio, is offering a new variable speed buffer, polisher and grinder. The Model 95 Buffer and Polisher provides a selective gear drive simple in design, positive in action, and flexible in speed which is said to maintain an efficient peripheral speed for any desired diameter wheel and eliminates slippage.



Model 95 Cincinnati buffer and polisher

This arrangement is also obtainable as a grinder (Models 64 and 65). When built this way the selective speed gears are interlocked with the speed lever so as to make it impossible to run the wheels at a dangerous rate of speed. As a grinder the guards are adjusted for various wheel diameters and wheel wear. Models 64 and 65 are especially designed for heavy, continuous work.

A Caterpillar Welder for R.R. Repairs

A new use has been found for industrial tractors of the tracklayer type, in the repair of railroad tracks and bridges by welding. A machine closely resembling the war-time tanks and carrying suitable welding equipment has been designed by the Lehigh Valley Railroad Company and the Westinghouse Electric & Mfg. Co. and was demonstrated to about 150 rail-



road engineering and operating executives at East Pittsburgh recently. The caterpillar welder is nearly 18 ft.

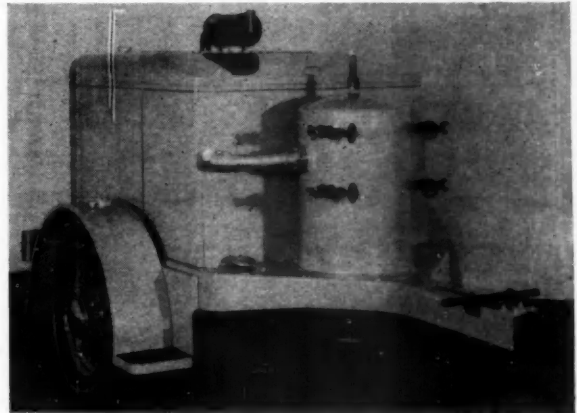
NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Portable Air Compressor Is Latest Amplex Product

The Amplex Mfg. Co., a division of Chrysler Motors, has recently placed on the market a portable air compressor set for which it is claimed that it

which is carried on two rubber-tired wheels. The air compressor has mechanically operated suction and delivery valves and its volumetric efficiency at the normal governed speed of 1200 r.p.m. is 88 per cent. All bearings of both the engine and compres-



Amplex portable air compressor

is low in first cost and operating cost, light, quiet in operation, and possesses a high degree of mobility. The set comprises a Chrysler four-cylinder industrial engine and a four-cylinder air compressor driven from the engine by belt; together with two radiators, an air tank and the needed accessories, all mounted on a rigid frame

sor are pressure-lubricated. Both the engine and the compressor have cylinders of 3½ in. bore by 4¼ in. stroke. The air tank has a capacity of 6 cu. ft. and is fitted with a safety valve set at 115 lb. per sq. in. The normal operating pressure is 100-105 lb. per sq. in. and the set is rated as having a capacity of 120 cu. ft.

long, 30 in. wide, and 36 in. high, and is geared for a speed of 1½ m.p.h. Its small width and height permit it

5 tons, this industrial "tank" is nearly as maneuverable as its war-time counterpart.

For track repair, the caterpillar welder is taken to the point of use on a flat car. It is run off the car under its own power and placed in position along the track. It may be placed between adjacent tracks, on a steep shoulder next to an outside track, or alongside a track in a narrow tunnel or on a narrow bridge. When the welder is in place, its generators furnish electric current for welding and to drive other repair tools such as rail grinders, slotters, drills, and the like.

The tractor welder provides railroads with an economical method of building up battered rail ends, worn crossings, and turnout frogs, and for the repair and construction of bridges, signal towers, water towers and other structures along railroad rights of way.

Caterpillar tractor welder climbing flat car for transportation to site of repair work

to be parked between adjacent tracks without interfering with passing trains. Although its weight is nearly

Overland Reorganization Plan Calls for \$2,500,000 New Cash and Security Exchange

Creditors Would Get Stock and Bondholders Stock and Bonds in New Companies to be Formed—Court to Hold Public Hearing on July 10 in Toledo

TOLEDO—Reorganization of the Willys Overland Co. on a basis which will eliminate all assets not used directly in making motor cars, eliminate a big portion of its debt and preferred stock liability, and concentrate the manufacturing operations in Toledo was announced in Federal Court here on June 28.

Copies of the summary of the plan are being dispatched to all security and claim holders.

Hope for early consummation of the plan is seen in the dating of the bonds Sept. 1, 1933, and establishment of July 20 as limit for deposit of securities under the plan. The latter date may be extended by the reorganization committee.

The reorganization plan provides for \$2,500,000 in new cash capital to be put into the business, it reduces the funded debt and fixed charges by more than 50 per cent, eliminates approximately \$8,000,000 of creditor claims, concentrates manufacturing operations with savings in production and administrative costs, writes down fixed assets to current levels, and by simplifying and consolidating operations lessens the working capital requirements.

The court has set July 10 as date for hearing on the plan.

The plan was presented to the court by Harold W. Fraser and Hampton G. Wall, secretary of the committee, both of the law firm of Fraser, Hiett, Wall and Effler, counsel for the reorganization committee along with Ropes, Gray, Boyden and Perkins, Boston and New York.

A new operating company will be formed with capitalization of \$1,000,000 of 6 per cent first mortgage bonds, \$2,000,000 of 6 per cent preferred stock of \$10 par value, \$5,000,000 of class A common stock of \$1 par value and 1,000,000 shares of class B common stock with no par value.

This company will take over the plant here, cash, inventories, accounts and notes receivable held by the company or receivers, all capital stock of the Willys Overland, Inc., Willys Overland Parts Corporation, Willys Overland Pacific Co., and Willys Export Corp., and such part of inventories, equipment, machinery, cash, notes and accounts as may be deemed desirable from Willys Overland, Inc., of Illinois, Willys Overland Inc., of Pennsylvania, the Willys Morrow Co., Wilson Foundry and Machine Co., Willys Overland Branches, Inc., and Willys Overland Sales Co. Ltd., and patents, licenses, trade-marks, trade names and brands of the old company as desired.

The \$2,500,000 of new capital will

be raised by sale of approximately that many shares of the class A common stock at not less than \$1 a share.

A corporation which will acquire the present administration building, land adjoining it, and assets of the subsidiaries not required for operations, will be formed to liquidate these properties. It will have 50,000 shares of preferred stock of \$10 par value and \$100 shares of common to be owned by the operating company. It will also issue a note for \$500,000 at

(Turn to page 26, please)

New Hupp Models Are Priced \$100 Lower

DETROIT—Hupp is in production on three new body types on its Series 321-A six-cylinder, 121-in. chassis. The new bodies parallel closely the deluxe types offered on this chassis but are priced \$100 lower. Prices follow: sedan, \$895; rumble seat coupe, \$895 and victoria, \$960.

Official Figures Put May Production at 227,567—Best Month Since June, 1931

Five Months' Total is 9 Per Cent Ahead of Last Year With Passenger Car Output Up 11 Per Cent —Production Index Jumps from 44 in April to 54

WASHINGTON, D. C.—May production of cars and trucks in the United States and Canada totaled 227,567 as compared with 188,922 in April and 192,516 in May, 1932, the respective increases being 18 and 21 per cent, according to the Census Bureau. This total is the largest for any month since June, 1931. It represents, moreover, a sharp reversal in the seasonal trend as May output ordinarily is slightly under April.

The phenomenal upward rush of production in April and May has brought the total for the first five months to 784,595 against 720,889 in the similar 1932 period, a gain of 9 per cent. This increase was due entirely to the expansion in passenger car output, which gained 11 per cent over last year in the five-month period as contrasted with a 2 per cent reduction in truck output. This loss, however, was undoubtedly made up in June as recently truck manufacture has been expanding more rapidly than car production.

May output of passenger cars was 17 per cent ahead of last year and 20 per cent above April. Production of commercial vehicles was 27 per cent

Oil Companies Quit Shop Equipment Sales

CHICAGO—The oil industry has definitely decided to get out of the service equipment business in every form, the Service Equipment Associates were informed at their meeting here last week by a Marketing Sub-Committee of the American Petroleum Institute. In the future, the oil companies will buy equipment only for their own company-owned stations and will not sell, lease or otherwise provide service equipment by any method to non-company-owned stations.

larger than in May, 1932, and 22 per cent above April, 1933.

Using the monthly average of production for the last years as normal, the May index of production was 54 as compared with 44 in April and 46 in May last year.

Canadian production totaled 9,396 as compared with 8,255 in April and 8,221 in May, 1932. Of the month's output, 8,024 were cars and 1,372 trucks. The total figure made May the largest month for Canadian producers in two years.

Motor Vehicle Production—U. S. and Canada

	Cars	Trucks	Total
May, 1933	192,656	34,911	227,567
April, 1933	160,307	28,615	188,922
May, 1932	165,025	27,491	192,516
5 mos., '33	664,539	120,056	784,595
5 mos., '32	598,144	122,755	720,889
Percentage Gains			
May, 1933, over May, 1932	17	27	18
May, 1933, over April, 1933	20	22	21
5 mos., 1933, over 5 mos., 1932	11	—2	9

WS

Estimated June Output of 240,000 Puts 1933 Production Well Over Million Mark

Industry Starts July with High Hopes of Repeating June Performance—Retail Sales Continue to Expand Disregarding Normal Seasonal Factors—Medium-Price Cars Show Gains

DETROIT—The automotive industry passed the million mark in production in the closing days of June in which month output of cars and trucks totaled approximately 240,000, the largest figure for any month in two years. The trend of operations at the vehicle plants was on a rising

scale throughout June as dealer orders piled in at an increasing rate despite the fact that normally sales tend to decline at this season. In fact the seasonal peak is now two months overdue.

As a consequence of the strong tone displayed by the retail market in June, the industry is entering July with high hopes that production this month will be close to June levels, if it does not exceed them.

In the first six months of 1933, total production amounted to about 1,025,000 units as compared with 911,000 in the corresponding 1932 period. This represents a gain of 12.5 per cent. With normal seasonal distribution, the first half record is at the rate of 1,770,000 units for the year. But in a year in which the industry has shown an utter disregard for

(Turn to page 27, please)

Code Drafted by N. A. D. A. Provides for 20 Per Cent Gross Profit on Used Cars

Administrative Organization on National, Sectional and Local Basis—Dealers to Agree to Raise Wages 5 Per Cent and Limit Working Hours to 40 per Week

ST. LOUIS—The National Automobile Dealers Association has distributed a tentative code providing for the operation of the nation's automobile dealers under the Industrial Recovery Act. The code provides (1) a national, sectional and local organization and administrative plan, (2) an immediate 5 per cent increase in wages and salaries of all automobile dealer employees, (3) a maximum work week of 40 hours for all except salesmen and executives and (4) control of used car allowances based on average allowance prices set locally to yield the dealer 20 per cent gross on his used car volume.

The organization and administrative plan calls for an Emergency National Committee of 25 members, one from each district which the code sets up, and a National Control Committee of one appointed from the membership of the Emergency National Committee. In each district the code would be administered by an Advisory Committee consisting of the N.A.D.A. director from that district and one representative from each dealer association in the district. Each association in a district will in turn appoint an Advisory Committee of from three to five members to act locally.

The Emergency National Committee, whose members are selected by the District Advisory Committee, is to be the general planning, administrative and coordinating agency. It will delegate authority to the National Control Committee of one which will function in an executive capacity and which will provide contact with the Government.

No mention is made in the code of such questions of factory dealer-relationships as fleet discounts, regulation of production, clean-ups, etc., because such matters call for joint action with the manufacturer, and the present code confines itself "only to those things which are under dealer con-

trol." The association bulletin containing the code states that "when the manufacturers, as a group, have decided to submit a code, the N.A.D.A. will confer with them and submit such points of interest to dealers in which both are concerned."

The regulation covering used car allowances follows: "To prevent sales below cost, heretofore due to unfair competition, that has resulted in the dissipation of the large part of the capital originally in this industry,

(Turn to page 27, please)

Ford Against Recovery Act, Ad Indicates

DETROIT—The Ford Motor Co. advertisement in the June 25 newspapers, addressed to all Ford workers, is being interpreted in some quarters as an indication that Mr. Ford is opposed to any governmental interference in his business under the National Industrial Recovery Act. The advertisement said in part: "We pioneered the 8-hour day, the 5-day week, a minimum wage that has always exceeded the market rate. Relations between employees and the Company have always stood on a just and human basis. We are as interested in social progress, and possess as sensitive a social conscience as any reformer whose theories have never met the test of a pay-roll. We pay for doing what we think is right. And we achieved these industrial decencies not by regulation or compulsion, but by being free of financial control and 'gentlemen's agreements'—free to do what we saw was right and necessary."

"We have no fears of what is ahead." The advertisement then goes on to say that decentralization is the next step in industrial development.

Associations Vote Joint Trade Show

To Be Held in Chicago
During Week of Oct. 29

NEW YORK—A joint trade show will be held again this year under the sponsorship of the Motor & Equipment Manufacturers Association, the Motor & Equipment Wholesalers Association and the National Standard Parts Association, as a result of an agreement reached this week by the three associations. The joint exhibition will be held in the Merchandise Mart, Chicago, during the week of October 29.

The joint show will be under the control of a committee consisting of three manufacturers from the M.E.M.A., three manufacturers and two jobbers from the N.S.P.A. and two jobbers from the M.E.W.A. The presidents of the three associations, George Brunner, William Hancock and Ed Satchell respectively, will constitute an advisory committee which will act only upon request.

This action brings to a happy conclusion a prolonged controversy which was precipitated by a resolution adopted by the N.S.P.A. at its last annual meeting calling for an N.S.P.A. show in 1933 in which, however, non-member manufacturers and jobbers were invited to participate. Subsequently, both associations took tentative steps to hold separate shows in Chicago. Decision to have a joint show, as has been the practice for the last three years, will naturally result in important economies for the industry.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

The trend of general business last week continued upward, with the majority of economic activities showing some degree of improvement. The betterment in trade persists despite the fact that this is the usual time for a seasonal slackening. Among the many encouraging reports is the increase in steel output to 50 per cent of capacity; this is the first time that steel production has been at that level since April, 1931.

Business More Active

The Guaranty Trust Company's index of business activity for May was 61.9, as against 54.8 the month before and 55.6 a year ago. The company's index of wholesale commodity prices on June 15 stood at 47.4, as against 43.7 a month earlier and 35.1 a year earlier.

Freight Loading Up

Railway freight loadings during the week ended June 17 totaled 587,931 cars, which marks an increase of 23,385 cars above those during the preceding week, an increase of 69,533 cars above those a year ago, but a decrease of 151,163 cars below those two years ago.

Lull in Retail Sales

Department store sales in the metropolitan area of New York during the first half of June were 1.2 per cent below those in the corresponding period last year.

Life Insurance Sales

Sales of ordinary life insurance in the United States during May were 10 per cent below those a year ago. This is

the smallest decrease below a similar period a year earlier since January, 1932.

Power Production Increases

Production of electricity by the electric light and power industry during the week ended June 17 was 9.5 per cent above that a year ago.

Imports and Exports Quiet

Exports during May amounted to \$114,000,000, as against \$131,899,000 a year ago. Imports totaled \$107,000,000, as against \$112,276,000.

Fisher's Index

Professor Fisher's index of wholesale commodity prices during the week ended June 24 stood at 64.0, as against 63.5 the week before and 62.7 two weeks before.

Stocks and Bonds Advance

After the sharp decline during the preceding week, the stock market last week resumed its upward trend. The bond market also advanced substantially. Trading on the stock market was active, surpassing five million shares on two days.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended June 21 showed decreases of \$32,000,000 in holdings of discounted bills and of \$1,000,000 in holdings of bills bought in the open market. Holdings of Government securities increased \$23,000,000. The reserve ratio on June 21 was 68.5 per cent, as against 68.3 per cent a week earlier and 68.1 per cent two weeks earlier.

16 Cities Gain 2 Per Cent Over 1932 Sales

BALTIMORE — Registrations of new passenger cars in 16 important cities were two per cent larger in the first five months of 1933 than in the same period of 1932, according to the monthly report of the Automotive Trade Association of Maryland. Gains over last year were shown in 10 of these cities. Comparative totals by cities follow:

	First Five Months		Per Cent Change
	1932	1933	
Baltimore ..	4,025	3,357	-16%
Buffalo	5,583	5,641	+1
Chicago	17,706	18,140	+2
Cincinnati ..	3,705	4,654	+26
Cleveland ..	6,985	7,279	+4
Dallas	1,787	2,193	+22
Detroit	14,660	15,495	+5
Indianapolis ..	3,617	3,012	-17
Kansas City ..	5,136	3,817	-25
Los Angeles ..	12,155	15,407	+27
Philadelphia ..	8,559	7,733	-9
Pittsburgh ..	6,023	5,936	-1
Rochester, N. Y.	2,629	2,994	+14
St. Louis	6,422	5,523	-14
Syracuse	1,767	1,926	+9
Toledo	1,482	1,631	+10
Total	102,241	104,738	+2%

Chicago Shares in Business Increases

Stewart-Warner Reports Gains — Chrysler Sells 115 Cars at Exhibition

CHICAGO—A Century of Progress and general business upturn have made Chicago an important way station on the road to industrial recovery.

Among the favorable announcements is that of C. B. Smith, president of Stewart-Warner Corp., who stated the corporation's business has paralleled the improvement in general business, with "more workers on the payrolls and their working hours increased."

Increased car sales and a sharp increase in service work are reported by the Chicago Automobile Trade Association.

At the world's fair, Chrysler Motors discloses, while an effort has been made to merchandise automobiles at the company's exhibit, sales have passed the hundred mark in the first 20 days of the fair. Up to and including June 15, sales of 115 Plymouth, Dodge, DeSoto and Chrysler cars were made. While many of the purchasers were Chicagoans, the majority were made to out-of-town and foreign visitors. Cars were delivered to people from Berlin, Germany; Sydney, Australia; Kauai-kiloa, Hawaii; Athens, Greece, and Osaka, Japan.

Hudson Motor Company has just opened its exhibition at the fair. The contribution adds television to the fair attractions. A television theater is located in the electrical building, with shows every half hour.

Moto Meter Statement

TOLEDO—Moto Meter Gauge & Equipment Co. reports a net loss of \$58,518 for the quarter ended March 31, against a loss of \$108,543 in the corresponding 1932 quarter. The March 31, 1933, balance sheet shows current assets of \$587,229 and current liabilities of \$212,628. Working capital is \$374,601.

Sales Increases Put Raybestos in Black

NEW YORK—May sales of Raybestos-Manhattan, Inc., exceeded \$900,000 as compared with \$707,500 in April, according to company officials. There has been a further improvement in June indicating a net profit of about \$225,000 in the second quarter as compared with a net loss of \$62,428 in the first three months of 1933.

Dodge Trucks Ahead of '32

DETROIT—Shipments of Dodge trucks this year to date exceed truck shipments made by the company during the 12 months of last year.

Exports Up 47% from May, 1932

Value of Sales Abroad
Also Rises — Shipments
9% Under April Totals

WASHINGTON, D. C.—May exports of motor vehicles from the United States numbered 7538 as compared with 5109 in May, 1932, a gain of 47 per cent. The total was nine per cent under April, however, when exports amounted to 8311.

Value of motor vehicles exported in May was \$3,754,835 as compared with \$3,131,782 last year, an increase of 20 per cent. Due to losses in the non-vehicle classifications, however, value of all automotive exports amounted only to \$7,434,095 in May against \$7,864,671 last year.

For the first five months of the year, all automotive exports were valued at 12 per cent less than in the same period in 1932. Truck and bus exports, however, increased in value by 17 per cent and passenger car shipments by 26 per cent. In units, truck and bus exports gained 26 per cent and passenger cars 26 per cent. As in the domestic market the improvement over last year is due entirely to substantial increases in exports of smaller-sized trucks and lower-priced cars.

Russel Reports 1932 Profit

TORONTO—Russel Motor Car Co., Ltd., reports a net profit of \$67,894 for 1932 as compared with profit of \$103,-

Federal Reserve Indexes Trend Strongly Upward

(1923-1925=100)	May, 1933 General	April, 1933	May, 1932
Industrial Production	76	67	60
Construction Contracts	17	14	26
Factory Employment	61	58	62
Factory Payrolls	42	39	46
Car Loadings	56	53	54
Department Store Sales	68	67	72
	Automotive		
Production	51	44	45
Employment	44	41	55
Payrolls	40	32	53

May indexes are preliminary. All indexes are adjusted for seasonal except payrolls.

090 in 1931. After dividends and reserves, the deficit for the year was \$149,106. The balance sheet shows as of Dec. 31, 1932, current assets of \$626,460 against current liabilities of \$142,000.

Exporters to Organize Foreign Trade Bank

NEW YORK—The board of directors of the American Manufacturers Export Association has authorized the appointment of a committee to organize a central bank for foreign trade under the Federal Reserve Act. The primary function of this bank will be to assist in liquidating frozen funds and to supplement the existing banking facilities through the grant-

ing of longer term credits than are now available. It will, in this connection, have access to the acceptance facilities of the Reconstruction Finance Corporation.

James D. Mooney, president of the American Manufacturers Export Association is expected to announce the personnel of the organization committee within a few days. The association will cooperate closely with the proposed bank, but without direct financial responsibility for its activities. All organizations interested in foreign trade are being invited to participate.

The directors of the Reconstruction Finance Corporation have assured the association of their most sympathetic cooperation with the new bank upon its organization.

Exports, Imports and Reimports of the Automotive Industry For May and Five Months Ended May, 1933-1932

	May 1933		May 1932		Five Months Ended May 1933		Five Months Ended May 1932	
	Number	Value	Number	Value	Number	Value	Number	Value
Automobiles, parts and accessories.....	.....	\$7,434,095	.....	\$7,864,671	.....	\$34,615,471	.....	\$39,218,997
Motor trucks, buses and chassis (total).....	2,445	1,227,495	1,505	837,746	13,847	6,025,873	10,946	5,135,748
Under one ton.....	340	111,267	17	37,105	1,587	436,284	1,204	312,106
One and up to 1½ tons.....	1,707	648,892	1,055	478,083	10,622	3,874,947	8,343	3,296,701
Over 1½ tons to 2½ tons.....	294	213,889	240	193,073	1,250	468,865	952	777,558
Over 2½ tons.....	90	247,375	80	119,903	308	669,289	368	639,993
PASSENGER CARS								
Passenger cars and chassis.....	5,093	2,527,340	3,604	2,294,036	28,863	1,382,944	23,011	13,534,520
Low price range \$850 inclusive.....	4,724	2,147,960	2,886	1,499,887	26,836	11,499,438	19,262	9,154,334
Medium price range over \$850 to \$1,200.....	224	218,514	390	363,235	1,186	1,144,948	2,178	2,101,929
\$1,200 to \$2,000.....	54	76,315	165	216,833	527	793,146	786	1,035,205
Over \$2,000.....	18	45,431	71	175,636	122	314,187	421	1,100,871
PARTS, etc.								
Automobile unit assemblies.....	.....	2,045,526	.....	2,813,309	.....	7,846,590	.....	11,287,417
Automobile parts for replacement (n.e.s.).....	.....	1,044,042	.....	1,139,665	.....	4,414,979	.....	5,646,803
Automobile accessories.....	.....	129,667	.....	154,138	.....	520,902	.....	924,734
Automobile service appliances.....	.....	72,891	.....	192,634	.....	326,554	.....	855,180
Airplanes, seaplanes, and other aircraft.....	29	510,733	16	153,325	177	2,412,761	50	578,202
INTERNAL COMBUSTION ENGINES								
Stationary and Portable:								
Diesel and semi-diesel.....	4	8,339	8	47,367	10	30,058	20	109,312
Other stationary and portable:								
Not over 10 hp.....	177	13,112	47	26,925	964	68,127	1,785	119,066
Over 10 hp.....	55	14,410	60	40,827	269	114,317	374	186,209
Automobile engines for:								
Motor trucks and buses.....	427	49,065	269	30,272	914	126,139	1,215	187,036
Passenger cars.....	2,763	164,496	4,583	283,373	9,674	613,920	12,865	1,046,546
Aircraft.....	25	76,701	44	38,567	676	521,047	131	311,910
Accessories and parts (carburetors).....	.....	74,878	.....	188,822	.....	386,385	.....	568,556
IMPORTS								
Automobile and chassis (dutiable).....	50	8,996	42	14,212	182	64,382	181	58,455
Other vehicles and parts for them (dutiable).....	.....	9,974	.....	6,303	.....	35,073	.....	20,534

Overland Reorganization

(Continued from page 22)

6 per cent to the operating company.

Funds secured from the liquidation will be used first to reduce the note, then to redeem the preferred stock, and then to call the mortgage bonds of the operating company.

Present bondholders are given \$500 of new bonds, 250 shares class A common and 25 shares of preferred of the liquidating company for each \$1000 of bonds now held.

Creditors for each \$1000 of claim receive 25 shares of operating company preferred and 250 shares of class A common.

Preferred stockholders receive for each \$100 par value of their present stock five shares of class B common.

Common stockholders receive one share of class B common for each 10 shares of old stock \$5 par value held.

The new operating company bonds are to be dated Sept. 1, 1933, and are to run for 10 years. They are callable at 105.

Preferred stock is to have cumulative dividends of 6 per cent from April 1, 1936, and has right to vote equally with class A common after eight quarterly dividends are passed.

Class A common stock is entitled to dividends of 12 per cent before any dividend is paid to holders of class B stock. If there are net earnings and not paid on class A then deficiency not exceeding 12 per cent is to be paid before any class B dividend. Class A has exclusive voting power except in case of preferred dividend default.

The Toledo Trust Co. and Bankers Trust Co., New York, are depositaries for bonds and preferred stock. Claims may be assigned to Commerce Guardian Bank, Toledo, or Bankers Trust Co. Common stock may be deposited with Citizens Trust Co., Toledo, or Bankers Trust Co.

Both creditors and preferred stockholders committees have approved the plan and will take such steps as are necessary to bring their groups in at once.

"It is of the utmost importance that the plan be consummated with the least possible delay," declared the committee headed by W. B. Stratton, New York. "The reorganization committee strongly recommends its acceptance and urges bondholders, holders of claims and stockholders to deposit without delay."

Under a liquidation it is believed that creditors would stand to lose practically all of their \$8,000,000 of claims but by this method they are given shares of which half take priority over new money put into the company and half rank equally with new stockholders' money and saves a customer.

Members of the committee in charge of the reorganization besides Chairman Stratton and Secretary Wall are W. J. Bryan, O. M. Havekotte, H. J.

Leonard, C. S. McIntyre and C. O. Miniger.

Due to the fact that Chairman Stratton was associated closely with John N. Willys, receiver, in the reorganization of the Fisk Rubber Co., it is believed that Mr. Willys is co-operating fully in the proposed plan.

Judge George P. Hahn in Federal Court has ordered the receivers to pay \$107,908 in back personal property taxes within 30 days. The company owes also about \$400,000 in real estate taxes but the court has no authority to order them paid.

Payment of the taxes would help materially in improving the position of the bondholders, it is held, because they became a first lien.

Rowland Named Director of DeSoto Advertising

DETROIT—R. M. Rowland, assistant general sales manager of DeSoto, has assumed in addition the direction of the company's advertising department according to an announcement by L. G. Peed, sales manager. He will be assisted in his new duties by T. G. McCormick.

J. F. Boyd, who has been serving as Plymouth sales manager for DeSoto, has been appointed director of districts with J. L. Ballard as assistant director. Dalton G. Feldstein will operate under Mr. Boyd's supervision in a sales promotional capacity. Used car representatives will also function under Mr. Boyd.

Wilber Succeeds Mattingly

ALLEGAN, MICH., June 27.—G. R. Wilber has been elected president of the Blood-Brothers Machine Company, succeeding L. H. Mattingly. Mr. Wilber for the past eight months has been connected with the sales department of the company and has been identified with the automotive industry for the past twenty-one years.

Federal Mogul Gains

DETROIT—Federal Mogul Company has reported May shipments were 33 per cent in excess of April and 60 per cent above March. The June shipment rate is now running about 10 per cent above the May rate. The report further stated that the company would show a profit for the first half of the year.

Mrs. M. D. Kelsey

DETROIT—Mrs. Margarette Dallas Kelsey, widow of John Kelsey, founder of Kelsey Wheel Co., died June 22 following an illness of several months. She underwent an operation three weeks ago, and death was attributed to complications.

Steel Output Now 53% of Capacity

Expansion of Production Largely Due to Activity in Automotive Field

NEW YORK—According to reports issued by The Iron Age, steel operations have expanded this week to 53 per cent of ingot capacity. The Iron Age says, "The upward swing of output, which has been uninterrupted since operations struck a low of 14 per cent in the third week of March, has marked one of the sharpest recoveries in the history of the trade."

"The expansion of production has been closely paralleled by a comparable growth of consumption especially on the part of automobile makers and other industries making consumer goods. It has been largely from tin plate, bars, strip, sheets and other light rolled products that the steel industry has obtained the tonnage which has made heavier operations possible."

"So far as the steel industry is concerned, the first phase of recovery appears to be over. The view is supported by the fact that latterly, at any rate, many buyers have been taking steel in excess of their known requirements. Buyers have been influenced to order out steel not merely on account of prospective price advance but because of continued uncertainty as to whom producers will again make firm quotations."

Budd Employment Passes 4600 Mark

PHILADELPHIA — More than 3000 men have been called back to work at the plants of the Edward G. Budd Manufacturing Co. within the past eight weeks. The total working force at the local plants, as the result of these additions, is now in excess of 4600 men.

Orders from the automobile industry was given as the major cause of the Budd company's activity, although another factor in Budd's expanding operations has been the entrance of the company into the railcar field. Last week the company announced the signing of a contract with the Chicago, Burlington and Quincy Railroad for the construction of a three-car train.

Fisher Output Up 91%

DETROIT—Fisher Body production for first six months exceeded half of last year's entire production by more than 91 per cent. For June alone, increase over corresponding month last year was more than 123 per cent. July production estimates are 118 per cent above output for July, 1932, with strong probability of running still higher.

June Output 240,000

(Continued from page 23)

usual seasonal influences, the chances now appear good that even this total may be exceeded substantially.

Estimates of June retail passenger car sales now range as high as 190,000. Reports from 40 states indicate that domestic car volume in May amounted to about 167,000 as compared with 131,000 a year ago and 120,000 in April. Of the 40 states which have reported, 34 show gains over May, 1932. While the market still is predominantly a low-priced one, medium priced lines are showing renewed vitality.

Latest reports on individual company sales follow:

In the week ending June 24, Dodge sales totaled 2334 cars and 540 trucks as compared with 2150 and 459 respectively in the preceding week. For the year to date Dodge is 53 per cent ahead of the corresponding period last year. In fact its sales now exceed the total for all of 1932.

Buick sales in the first 20 days of June were ahead of the same period in May, and the second 10-day period in June exceeded the first 10 days by 27 per cent.

A 74 per cent gain was registered by Pontiac in the first 20 days of June over last year and its sales in the second 10-day period of June ran ahead of the first period of the month by 11 per cent.

Studebaker reports sales of 6016 cars in the first 20 days of June, representing gains of 51 per cent over the same period last year and 53 per cent over first 20 days of May.

Sales of DeSoto and Plymouth cars by DeSoto dealers number 2667 in the week ending June 24, an increase of 33 per cent over last year. Shipments to DeSoto dealers during that week totaled 3412 DeSoto and Plymouth cars. These figures constitute new DeSoto records.

June production of Plymouth totaled more than 40,000 setting a new record for the company. More Plymouths already have been shipped this year than in all of last year. For six months output was 68 per cent ahead of 1932 same period and 111 per cent more than in 1929.

Hudson-Essex retail sales in June were 58 per cent larger than in June, 1932, and 13 per cent ahead of May, 1933. During the week ended June 24, sales set a new high for the year.

Oldsmobile boosted production schedules twice during June after having the best month in May since July, 1931.

L. G. Aldrich

WAYNESBORO, PA.—L. G. Aldrich, manager of the Chicago office of the Landis Tool Co., died recently at the age of 40. Prior to joining the Landis company five years ago, Mr. Aldrich was with International Harvester.

From Making Cars To Brewing Ale

CLEVELAND—Peerless Motor Car Corp., according to information furnished to the New York Stock Exchange, has decided to enter the brewing business.

No automobiles have been manufactured since the end of 1931. It is proposed to sell 178,150 shares of common stock which is now in its treasury, at \$3.00 per share, to provide funds for the alteration of the plant and additional working capital.

The plant will have a capacity of 150,000 barrels of ale a year after the installation of equipment which will cost \$533,640.

The company will also issue \$300,000 of three-year 6 per cent notes to contractors and sellers of equipment. A subsidiary to be known as Peerless Company will manufacture the ale. It is understood that only one quarter of the parent company's floor space will be used by this subsidiary.

Code Drafted by N.A.D.A.

(Continued from page 23)

and annual losses estimated now at the rate of \$50,000,000, it is agreed that the automobile retailing industry will regulate itself by fixing allowances on used cars, by first giving consideration to the public interest on the principle that a used car allowance for all models be set at the average price such cars are marketed for in any given district or locality less 20 per cent for overhead and selling expense, less cost of reconditioning necessary to put the vehicle in average running condition. Such a price to be revised from time to time in accord with market conditions and increased price of new cars. Such price to be agreed upon by the majority of each component association or preferably by each district. Such allowance schedules as approved by the component association then will be filed by each Executive Committee with the District Advisory Committee, which will attempt to simplify them and make them uniform. Then the District Committee approves and files with the Emergency National Committee for further refinement and simplification if desirable, before presenting to the government."

The proposed code makes no marketing recommendations on such matters as closing on Sundays, Saturdays and holidays, parts discounts, credit regulation, fraudulent or deceptive practices, price cutting, commercial bribery, etc., but advises each local group to make its own recommendations on these points, final decision to rest with the Emergency National Committee and, of course, the government.

Federation of Truck Associations Planned

Committee Framing Code in Washington Meeting

CHICAGO — Representatives of some 30 state motor truck associations met here over the week-end of June 24 and made plans for the formation of a national federation of motor truck associations and the framing of a code whereby for-hire operators would comply with the provisions of the National Industrial Recovery Act.

The question of whether or not a national federation should be organized will be decided by a vote of the memberships of state, local and vocational trucking groups numbering about 100. Each group favoring a federation has been asked to send two delegates to an organization meeting which will be held in Chicago on July 11. One of these delegates must be a representative of the haul-for-hire group of the association. He alone will have a vote on matters pertaining to the code.

The code to be taken up at the July meeting will be framed by a committee of three men: Theodore D. Pratt, general manager, New York State Motor Truck Association; Frank Coughlan, of the Missouri Truck and Terminal Association, and J. C. Keeshin, president of the American Highway Freight Association. This committee will meet in Washington on Friday, June 30, to prepare the code which will be the basis of discussions at the Chicago meeting.

The results of the voting by individual associations on the national federation question will be submitted to Tom Snyder, secretary of the Truck Association Executives of America, which called the meeting held here.

Hoffman Reports Big Studebaker Increases

SOUTH BEND, IND.—Orders received for Studebaker and Rockne passenger and commercial cars up to June 20 totaled 6016 units, according to an announcement made here today by Paul G. Hoffman, president of The Studebaker Sales Corp. of America. This total is 59.5 per cent greater than the total June orders received up to June 20, 1932, and 53.1 per cent more than the total May orders received up to May 20, this year.

Standard DeSoto Improved

DETROIT — DeSoto standard models are now equipped with high compression heads raising the horsepower from 79 to 82 and with low-pressure balloons on wood wheels, at no increase in price. Two trumpet horns also are furnished, a new trim style has been adopted and headlamps are of the same type used on the custom models.

Massachusetts Ford Report Indicates 1932 Loss of \$74,861,644 Equal to \$166 per Car

Write-Downs Add \$30,000,000 to Loss Indicated by Preliminary Balance Sheet Filed Earlier in New Hampshire—Biggest Loss in Company's History

BOSTON, MASS.—A net loss in 1932 of \$74,861,644 is indicated by the condensed balance sheet filed here by the Ford Motor Co. with the State Commissioner of Taxation. This compares with an indicated net loss of \$53,586,000 in 1931 and is the largest deficit sustained in any year of the company's history.

Based on an estimated production of 450,000 units last year, the loss per car approximates \$166.

The Massachusetts balance sheet for Dec. 31, 1932, shows substantial write-downs from the preliminary report filed in New Hampshire and reported in *Automotive Industries* of May 20. These write-downs account for the fact that the loss on the basis of the Massachusetts report is more than \$30,000,000 larger than the New Hampshire report indicated. Inventories were written down about \$9,500,000; real estate was valued at about \$4,000,000 less, and machinery and equipment at about \$17,500,000 less.

Compared with the Dec. 31, 1931, balance sheet, the major reductions in assets are \$68,831,675 in cash, receivables, etc., \$6,540,350 in inventories and \$15,933,612 in machinery and equipment.

Extreme liquidity was maintained, however, as current items total close to \$370,000,000, against accounts payable of \$30,000,154. Total assets dropped \$88,071,813.

A comparison to production and indicated earnings back to 1926, the last full year of Model T production, follows:

	Approximate Production	Indicated Earnings
1932.....	450,000	—\$74,861,644
1931.....	750,000	— 53,586,000
1930.....	1,500,000	+ 44,460,823
1929.....	1,951,092	+ 81,797,861
1928.....	854,818	— 72,221,498
1927.....	454,601	— 42,786,727
1926.....	1,810,029	+ 75,270,895
		—\$41,926,290

Following are the Dec. 31, 1931 and 1932, balance sheets as filed in Massachusetts:

	Dec. 31, 1931	Dec. 31, 1932	Change
Inventories.....	\$64,884,691	\$58,344,341	— \$6,540,350
Cash, received and inv.....	372,483,105	303,650,430	— 68,832,675
Machinery and equipment.....	124,601,735	108,668,123	— 15,933,612
Real estate.....	158,387,688	157,685,318	— 702,370
Prepaid taxes and insurance.....	1,972,496	5,909,690	+ 3,937,194
Total assets.....	\$722,329,715	\$634,257,902	—\$88,071,813
Accounts payable.....	\$38,824,298	\$30,000,154	— \$8,824,144
Reserves, etc.....	10,938,670	6,552,645	— 4,386,025
Capital stock.....	17,264,500	17,264,500	—
Surplus.....	655,302,247	580,440,603	— 74,861,644
Total liabilities.....	\$722,329,715	\$634,257,902	—\$88,071,813

Reciprocity Conference to Meet at Harrisburg

HARRISBURG, PA. — An Interstate Conference to consider the problem of uniform regulations for buses and trucks among 16 Northeastern States will meet here October 20 and 21. This conference is being organized by the American Legislators' Association at the request of the Pennsylvania Legislature.

The conference will consider the desirability of reciprocal and uniform laws and regulations relating to the size, weight, height, and length of motor vehicles which transport passengers and freight, and will probably make recommendations to the legislatures of these states for uniform legislation on these subjects.

Those participating in the conference will include governors, lieutenant governors, motor vehicle commissioners, public utility commissioners, chairmen of the special legislative committees on this subject, and

those designated from the membership of the Senates and Houses of the participating States to represent them at Harrisburg. Representatives from the U. S. Bureau of Public Roads will also be invited to attend and are expected to play an important part in the conference.

H. B. Lewis Offers New Advertising Service

NEW YORK—H. Bertram Lewis, widely known throughout the industry for his writings on practical operating problems of the car dealer, has resigned as vice-president of the Commercial Credit Co.

He has established an office at 100 East Forty-Second Street and will continue his widely read "Automotive Observations" which will be distributed through a selected list of regional finance companies.

In addition, he will produce house

organs and other direct mail features in collaboration with other specialists in this field. He will also publish a house organ of an unusually interesting character somewhat along the lines of "Credit Where Credit Is Due" except that the size will be 8½ by 11 inches. This publication will be known as "Howdy Judge" and will be offered to advertisers in non-competitive fields.

Gas Pump Manufacturers Organize for Recovery

DAYTON, OHIO—Nelson Talbott, president of the National Pumps Corp., was elected president of the newly formed Gas Pump Manufacturers Association at the organization meeting held here. The new association was formed to establish a code under the National Industrial Recovery Act. Other officers chosen include S. F. Hope, Gilbert and Barker Mfg. Co., vice-president; S. B. Bectel, S. F. Bowser Co., treasurer, and Breck McAllister, secretary.

Marmon-Herrington Brings Out New Line of 21 Trucks

INDIANAPOLIS—A complete new line of four- and six-wheel-drive motor trucks consisting of 21 models with capacities from 1½ to 20 tons and priced from \$2,250 to \$19,450, has been brought out by the Marmon-Herrington Co., Inc. All models are offered in either two or three wheelbase lengths. Three each of the four and six-wheel drive models ranging in capacity from 7 to 20 tons, are powered with Diesel engines.

Dall Mfg. Succeeds Dall Motor Parts Co.

CLEVELAND—The Dall Manufacturing Co., Inc., has succeeded the Dall Motor Parts Co. following the investment of additional capital by L. A. and J. R. Dall. L. A. Dall continues as president and general manager as do J. R. Dall as vice-president, K. M. Wilmore as secretary and W. M. Balliet as treasurer.

Fry Products Appoints Agency

DETROIT — Fry Products, Inc., manufacturers of automobile seat covers, has appointed Brooke, Smith and French, Inc., as advertising and merchandising counsel, according to an announcement by Walter J. Fry, president.

McConnell Heads Boosters

PHILADELPHIA—Ralph E. McConnell, manufacturers' representative of this city, has been elected president of the Automotive Boosters' Club International, succeeding James E. Redman who has resigned.

May Canadian Output Largest in Two Years

Exports Quadruple While Imports Drop 25 Per Cent

TORONTO—Production of 9396 motor vehicles in Canada during May was the highest output for any month since May, 1931, when 12,738 cars were made in the Dominion, according to official statistics of the industry just released. The advance in May was the third successive gain during the current year. Production for March was 101 per cent larger than that for February; April production was 24 per cent higher than that for March, while the Canadian output for May was 14 per cent greater than the total for the previous month.

The principal increase for the month of May over the preceding month was in passenger cars which rose to 8024 from 6957, while trucks showed improvement with a total of 1372, as against 1298 for April.

During May, 7167 cars were made for the domestic market, leaving a balance of 2229 for export. The number of automobiles imported into Canada during May was only 159, so that the apparent consumption of new motor vehicles amounted to 7326.

For the five months ending May 31, the number of motor vehicles produced in the Dominion was 40,939, as compared with 32,557 for the corresponding period of 1932. The number of imported vehicles for the 1933 period was 771, while 6415 were exported, according to the Customs' records. One year ago the total of exported motor vehicles was 2317 for five months, while the imports totaled 1007. Thus, while Canadian export of automobiles is almost 300 per cent greater, the importation is down by more than 25 per cent.

Offers \$300,000 for Durant's Lansing Plant

LANSING—A bid of \$300,000 was submitted for the property and buildings of the Durant Motor Company of Michigan when the plant was placed on the auction block here on June 24. The bid was submitted by R. H. Curtiss, partner of the law firm of Beaumont, Smith & Harris, Detroit, and is subject to the approval of Judge Edward J. Moinet, in federal court at Detroit. A hearing is scheduled for 10 a. m. on June 30, before William S. Sayres, master of chancery at Detroit.

Although it has been reported that the federal court will not approve a bid of less than \$500,000, the receivers indicated acceptance of the \$300,000 offer would be advised due to the cost of maintenance of the Durant plant while waiting for a higher bid.

The Detroit attorney said he was representing the Lansing Manufacturing Company, which was incorpor-

ated with the Secretary of State here on June 22. It has been rumored here that the Detroit law firm represents a large manufacturing concern with headquarters in Chicago. This firm is reported to own seven plants scattered throughout the country and is said to be interested in centralizing activities in Lansing.

Walker Sale Proposed

CHICAGO—Walker Vehicle Co. has contracted with an unnamed purchaser for the sale of its assets including its subsidiary, the Automatic Transportation Co. The purchase offer is subject to the approval of 85 per cent of the holders of the company's \$1,250,000 of 5½ per cent notes. Under the plan it is expected that they would receive more than 40 cents on the dollar.

Continental Opens Warehouse

CHICAGO—Opening of a Continental Automobile Warehouse and parts depot was announced last week by Homer H. Goff, district manager. The warehouse is at 7215 Exchange Avenue. It will include service for Chicago territory dealers, parts department and display of Continental models.

Brunner Appoints Allen

SYRACUSE, N. Y.—W. C. Allen has been appointed sales manager of the Brunner Mfg. Co., succeeding Joseph J. Burke who has resigned. Mr. Allen has been devoting his efforts for the Brunner Company to sales in the industrial and electrical refrigerator field. He was formerly sales manager of the Black & Decker Mfg. Co.

M.E.W.A. Prepares Recovery Act Code

Urges Automotive Jobbers Be Considered Separately

CHICAGO—That automotive wholesalers should be considered as a separate classification under the National Industrial Recovery Act and that wholesale distribution generally should be represented on the government administrative body, were among the conclusions reached by the Motor & Equipment Wholesalers Association at its second annual summer conference held here last week.

A code of fair competition has been developed by a committee headed by S. B. Dean of St. Paul but its details are not being divulged "in deference to elements in the automotive wholesale industry not embraced within the M. E. W. A. membership or the rosters of its regional groups." The same situation applies regarding the plan of procedure through which a code is expected to be presented to the Recovery Act administration, this code to represent the views of all organized bodies having a membership engaged in wholesale distribution.

More than 50 representatives were present at the three-day session. Discussion centered around the Recovery Act. Among the speakers were B. W. Ruark, general manager of the association, Elton R. Seager and W. R. Crow.

Edward McCann

DETROIT—Edward McCann, district sales manager for the Scoville Manufacturing Co., died June 20 following a prolonged illness. He was 50 years old and had been connected with Scoville for the past 20 years.

B. E. Hutchinson, board chairman of Plymouth, breaks sod for the company's new quarter-mile driveway yard in Detroit. The smiling onlookers are General Sales Manager Mooock and Advertising Director Wagstaff under whose direction Plymouth has set new all time sales records for six successive weeks



Continental to Write Down Capital Stock

DETROIT—For the six months ended April 30, Continental Motors Corp. reports a net loss after depreciation, taxes, etc., of \$1,432,917 against a deficit of \$1,026,660 in the same period a year ago.

The consolidated balance sheet shows current assets of \$2,552,801 including \$181,414 cash, \$524,118 receivables, \$271,613 marketable securities and \$1,575,655 inventories. Current liabilities total \$1,100,024 and consist of \$467,643 notes and acceptances payable, \$380,620 accounts payable and \$251,762 accrued taxes. Working capital is \$1,452,777 as compared with \$4,405,155 a year ago.

Stockholders are to vote on July 6 on a proposal to change the \$23,898,907 no par common stock to \$1 par, to write down \$5,908,317 of goodwill to \$1, and also to increase the authorized capital stock from 3,000,000 to 5,000,000 common shares. Giving effect to these proposals the balance sheet will show a capital stock liability of \$2,113,000 and surplus of \$11,611,312.

Michigan Registrations Up 33 Per Cent from 1932

DETROIT—New passenger car registrations in Michigan during May totaled 11,841, an increase of 172 per cent over April this year and 33 per cent over May, 1932.

Ford continued to lead with 3497. Chevrolet with 3229 showed the largest proportionate increase among the leaders with 51 per cent over May last year. Plymouth registered 1524.

Particularly good showings were made by Dodge with 460 per cent increase, Essex with 190 per cent, Pontiac 118 per cent and Oldsmobile 75 per cent.

Gains over May, 1932, were shown also by Auburn, Buick and Packard.

Commercial registrations totaled 879 compared with 763 in May, 1932 and 292 in April this year. Chevrolet lead in registrations for the month with 338. Ford was second with 292, International third with 103 and Dodge fourth with 64.

Hall to Make Valve Seat Grinder for Ford

TOLEDO—The Hall Manufacturing Co. here has been awarded a contract to equip all Ford Motor Co. service stations with its eccentric valve seat grinder.

The company uses the grinders for its production of motors and has adopted a hardened steel valve seat.

The Hall company here for many years makers of cylinder hones and similar equipment perfected the eccentric valve seat grinder tool last year.

Plans are made to double the em-

ployment in the local plant as a result of the Ford business.

Ernest A. Hall, president, said that many valuable suggestions for perfection of the new grinder were made by Henry Ford and Charles Sorensen, general manager of the Ford plants.

Marks and Doman Have New Air-Cooled Motor

SYRACUSE, N.Y.—E. S. Marks and C. T. Doman, who resigned recently as chief engineer and research engineer of the Franklin Automobile Co., have designed a new air-cooled engine for trucks, compressors and general industrial use. Plans have been completed for the formation of a new company to make and distribute this product and quantity production is expected in the near future.

Stehr to Make Piston Rings in Detroit Plant

DETROIT—The Stehr Piston Ring Co., of San Diego, Calif., has definitely decided to establish manufacturing headquarters in Detroit, according to an announcement by the Detroit Board of Commerce. The plant is located at 7049 Lyndon St., rented from the Austin Company. Manufacturing will begin in a few weeks, the announcement stated. The company manufactures a multiple segment, laminated ring.

CALENDAR OF COMING EVENTS

SHOWS

Int. Assoc. of Show and Assoc. Managers, Chicago	July 24-25
Eastern States Exposition, Springfield, Mass.	Sept. 17-23
Natl. Assoc. of Motor Bus Operators, Chicago	Sept. 21-22
National Metal Exposition, Detroit	Oct. 2-6
Joint Trade Show, N.E.M.A., N.S.P.A., N.E.W.A.	Oct. 30-Nov. 4
New York Automobile Show	Jan. 6-13, 1934
Chicago Automobile Show	Jan. 27-Feb. 3, 1933

CONVENTIONS

National Industrial Advertisers Assoc., Chicago	June 26-28
National Metal Congress, Detroit	Oct. 2-6

MEETINGS

Automotive Engine Rebuilders Assoc., Annual, Chicago	July 10-14
S.A.E. International Automotive Engineering Congress, Chicago	Aug. 28-Sept. 4
American Chemical Society, Chicago	Sept. 11-15
American Transit Assoc., Chicago	Sept. 18-20
Natl. Safety Council, Chicago	Oct. 2-6
National Metal Congress, Detroit	Oct. 2-6
American Petroleum Institute, Annual, Chicago	Oct. 24-26

C.F.R. Group Finds Against Alky Blends

Give Fewer Miles Per Gallon and Less Power

NEW YORK—Well authenticated facts demonstrating the inferiority of ethyl alcohol gasoline blends in comparison with gasoline are presented in a report of a special committee headed by H. L. Horning of the Cooperative Fuel Research Committee. The report follows:

"Comparing gasoline and the proposed 10 per cent alcohol mixture in the same gasoline, the following are established facts:

"1. Acceleration is the outstanding performance characteristic demanded by the public, and carburetors are set for this. For equal acceleration the fuel consumption with the blend is approximately four per cent higher than with the straight gasoline. This statement is based on measured performance in cars and corresponds to the heat content of the respective fuels.

"2. Engine starting is more difficult with the alcohol blend. The tendency to vapor lock is greater with the blend and still greater if adjusted to give equal starting ability.

"3. The alcohol blend has a higher antiknock value of approximately five octane units but at a much higher cost per unit than by other available means.

"4. The tendency of alcohol to absorb moisture from the air and the water which normally accumulates in gasoline during storage and service is frequently sufficient to cause separation of the alcohol from gasoline.

"5. If alcohols were desirable as fuels for blending, the petroleum industry could produce them at less cost from petroleum than they can be produced from corn or other agricultural products. Technically speaking, ethyl alcohol is less desirable than the higher alcohols for blending with gasoline.

"The committee desires to point out that there are other problems arising from the use of alcohol blends, such as corrosion of engine and fuel pipe lines, and the effect of the solvent action of the blends. It also calls attention to the fact that less horsepower hours are available per dollar in blends than in gasoline, but refrains from stressing these economic facts or such other aspects as law enforcement, tax evasion or reasons for using alcohol in countries which have no petroleum resources."

The above facts are drawn from a mass of contributing data, collected from the automotive and petroleum industries and the Bureau of Standards, now being formulated into a more elaborate and detailed technical report, including a program of proposed experimental research directed toward clarifying controversial points. This report will be made available later.

Mrs. Zeder Ill

DETROIT—Mrs. Fred M. Zeder is improving following an emergency operation in the Chatham, Ont., hospital. She is being attended by three Mayo physicians who flew from Rochester, Minn., by airplane.



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